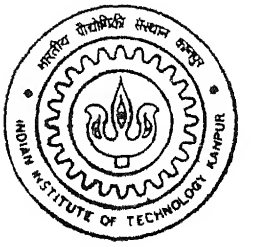
Validating relations between Objectives, Strategy Making Processes and Decisions from actual field data for German and Indian Manufacturing Companies

by
Shobhit Shrotriya



DEPARTMENT OF INDUSTRIAL & MANAGEMENT ENGINEERING
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Validating relations between Objectives, Strategy Making Processes and Decisions from actual field data for German and Indian Manufacturing Companies

A Thesis submitted
in Partial fulfillment of the Requirements
for the degree of

MASTER OF TECHNOLOGY

By

Shobhit Shrotriya
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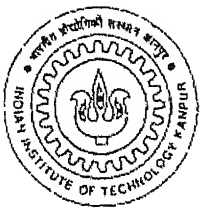

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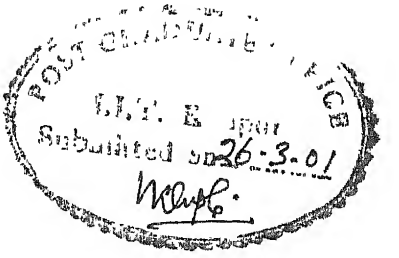

CERTIFICATE

This is to certify that the present dissertation entitled **"Validating relations between Objectives, Strategy Making Processes and Decisions from actual field data for German and Indian Manufacturing Companies"**, has been carried out by Mr. Shobhit Shrotriya (Roll No. 9911414) under my supervision and that this work has not been submitted elsewhere for a degree.

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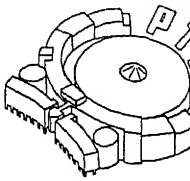

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CERTIFICATE

This is to certify that the dissertation entitled **"Validating relations between Objectives, Strategy Making Processes and Decisions from actual field data for German and Indian Manufacturing Companies"** submitted to the Department of Industrial & Management Engineering, Indian Institute of Technology, Kanpur by **Mr. Shobhit Shrotriya (Roll No. 9911414)** in a partial fulfilment of the requirements for the award of the degree of **Master of Technology** in **Industrial & Management Engineering**, is a bona-fide work carried out by him under our joint supervision and guidance. This work has not been submitted elsewhere for any other degree or diploma.

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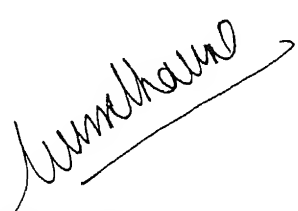

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ABSTRACT

Earlier work on relating Manufacturing strategy to Objectives was based on common sense, Reddy (1999) and Behera (2000) We take a re-look at the above relationship in light of literature, Miles and Snow et-al (1978) and show that this leads to substantial corrections

We found that almost 50% of German and Indian Manufacturing firms had poorly designed Organizational Structures when related to their stated Objectives, and according to theoretical framework deduced from Miles and Snow et-al (1978) By extending the framework of Miller (1987) we deduce that both *'Defenders'* and *'Prospectors'* are likely to have all three processes of strategy making, i.e., *'Rational'*, *'Interaction'*, *'Assertiveness'*, though we are unable to say that all three must be of equal strength. We found from actual data that 50% of German Manufacturing firms used *'Interaction'* as dominant Strategy Making Process while 50% of Indian Manufacturing firms used *'Assertiveness'* as dominant Strategy Making Process We are unable to offer theoretical explanation for the same but it is an interesting observation. We also found that *'Defenders'* and *'Prospectors'* in our data used 'any' of the Strategy Making Process Thus relationship between Objectives, Contents and Process was very weak. This was contrary to suggestion by Sharma and Upadhyay (1998).

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CHAPTER – 1

INTRODUCTION

1.1 Management and Manufacturing Strategy:

For *'Management'*, the branch of science which deals with the control and organization of certain activities for a business firm etc , managing an organization is a more vital and trivial part than producing a product in it as far as manufacturing organizations are concerned. One of the oldest and the most important branch of management are that of Production Management and Strategic Management But, it became a slightly neglected part during the early part of the twentieth century. However, it has now been realized that it is a very important part for the corporate and business strategies comprising of well-coordinated activities and actions meant for a long-term suitable advantage over the competitor.

The process model of manufacturing strategy is a newer concept as compared to the other branches of management science A new revolution in this field has been brought by Skinner (1969) in which the manufacturing strategy literature has been developed on the lines of the contents of manufacturing strategy The conceptual work published in the 1970's lead many authors to join in the fray of discovering the importance of manufacturing strategy. It again gained a lot of momentum in the 1980's and now has become a broad area of research and in our work we have tried to make an attempt to enlist some of the major area of discussion.

The concept of manufacturing strategy can be broadly classified into two categories:

1. Competitive priorities that help in appropriately targeting the manufacturing resources
2. Decision areas of manufacturing functions that help anyone to set objectives set by the market conditions.

A very important area we have discussed is the issue of 'focus' and 'trade-off'. Skinner stated that manufacturing strategy and the manufacturing decisions have to be designed according to certain pre-decided set of manufacturing objectives The organization can't be expected to excel in all the fields But Skinner had also admitted that once an organization has decided to focus on a particular task or the objectives they would design the manufacturing strategy accordingly and its really very difficult to re-design the decisions for any change in the objectives For example, manufacturing decisions in an organization can be designed in the following ways, like on.

1. Plant and equipment
2. Production Planning and Control
3. Labor force and staffing
4. Product design and Management
5. Organization and Management
6. Organization Structure
7. Vertical Integration
8. Vendor Relations
9. Capacity and Technology

These decisions are poised according to the manufacturing objectives of the organization. The main objectives of an organization may be like manufacturing cost, delivery performance, volume fluctuation, quality and reliability, innovativeness and introduction of new products, etc The design of the manufacturing decisions will be different when these decisions are at their lowest priorities as compared to when at the highest level

1.2 Organization of Thesis work:

In the work entitled **"Validating relations between Objectives, Strategy Making Processes and Decisions from actual field data for German and Indian Manufacturing Companies"**, we consider strategy making process, manufacturing decisions and objectives for manufacturing firms. Relevant literature review is given in Chapter 2. Conceptual framework is given in Chapter 3. In this work, we have

verified the hypotheses developed by Reddy (1999) and Behera (2000) and modified them on occasions to develop a new set of hypotheses. In Chapter 4, we have given the methodology adopted for verifying this framework and presented the data collected from German manufacturing firms and the borrowed data from Behera (2000), Reddy (1999) and Upadhyay (1997) for the Indian manufacturing firms Chapter 4 also includes the analysis and discussion of the collected data Finally, important conclusions are included in Chapter 5. The questionnaire has been included in the appendix

CHAPTER – 2

LITERATURE REVIEW

The literature on manufacturing strategy revolves around some important fields like manufacturing strategy, process model of manufacturing strategy, taxonomy of manufacturing strategies, relationship of corporate strategy with the manufacturing strategy and importance of the objectives like product variety, delivery performance and volume flexibility in making manufacturing decisions Since the seminal work of Skinner (1969), the manufacturing strategy literature has developed on the lines of 'contents' of manufacturing strategy In this piece of research work an attempt is made to relate streams of research works done in manufacturing strategy, i e , its "objectives", "contents" and "processes"

2.1 Definition of Manufacturing Strategy:

A broad definition of manufacturing strategy can be given as follows·

"Manufacturing Strategy can be defined as a set of action plans that provides a vision for the manufacturing organization based on its business strategy. It consists of th objectives and the strategies of the program which helps the business to gain, maintain or to take a competitive advantage".

The manufacturing strategy of an organization is closely related with business and the functional strategies. This can be explained as business strategy being the first phase of manufacturing strategy process and by involving different functional people it can be easily achieved.

2.2 Manufacturing in Corporate Strategy:

The work by Skinner gives a good concept about the manufacturing in the corporate strategy. In his work of "Manufacturing – Missing link in the Corporate Strategy", he introduced the concept of manufacturing in the corporate strategy. In his work he had

stated that the manufacturing system is always designed for a purpose and focus and attention is paid to a task, which will create clear strategic advantage. All the elements should be designed for that task and they must fit together for that purpose. The proper design of the manufacturing system is a vital task as for a poor design; no patching can make the system to work. There should be proper effectiveness as it is the only way to reach the goals.

One of the works by Schumpeter (1883-1950), argues that the main agents for the growth of an organization are those entrepreneurs who introduce new products, new methods of production to meet the delivery date and introduce other innovations in the activities. He believed that innovations typically represent the improvements in terms of the product or the process utility and as a result create greater buyer interest and overall economic activity. One of the major themes that emerged is the firm level of the entrepreneurial intensity is effected by both the internal and the external corporate context. Firms in the turbulent vs. stable environments are more innovative, risk taking and pro-active. There are mainly five dimensions of the strategic management for the corporate entrepreneurship. These dimensions are (i) Scanning intensity (ii) Planning flexibility (iii) Planning horizon (iv) Locus of planning (v) Control attributes.

2.2.1 Scanning intensity - refers to the managerial activity of learning about events and the trends in the environments. It provides managers the trend and the events in the relevant environments and provides opportunity recognition. It also helps the managers to reduce the uncertainty. As a means of partial uncertainty absorption, it will lower the risk in the venture and will make sure that the company will engage in that venture. So it provides that a positive relationship exists between the scanning intensity and the corporate entrepreneurship.

2.2.2 Planning flexibility - is the capacity of the firm's strategic plan to change as environmental opportunities. Flexible planning will allow the plant to manage with the changes. But as per Newman (1951), once a manager makes a plan he will try to make it happen at any cost. Also, the more clearly it is articulated, the more will be the resistance for the plan. For a conservative firm, the planning will not be very

effective. Despite of all these constraints planning still gives a mode for the organization for meeting the environmental change.

2.2.3 Planning horizon – is the length of the time for which the decision-makers consider in planning. This can vary from less than one year to more than 15 years depending on the type of the firm. For those firms, which compete in turbulent environments, having a short product life cycle will have a short period of planning horizon as that in a static environment. So, a negative relationship exists between the planning horizon and the corporate entrepreneurship.

2.2.4 Locus of Planning – is the employees' involvement in the planning procedure. A deep locus means a high involvement of the employees in the decision making. It will bring employees closest to the customers. Also, it will increase in the diversity of the viewpoints for making a strategic plan. So, a positive relationship is there between deep loci of planning with the corporate entrepreneurship.

2.2.5 Control attributes – will make sure that the firm makes its objectives and goals. There are two kind of control like the strategic control and financial control. The former is necessary for a competitive organization and has a positive relationship with the corporate strategy and financial control is for the conservative firms.

Skinner (1969) stated that the most important factor for the survival of a firm is the management of the manufacturing. A manufacturing system is a very expensive entity and risky in size, capital and location. It requires trained workers and managers for a proper operation. Again, it requires correct quality, cost and time. It has to compete in turbulent and dynamic environments. So, it became very difficult for a costly and risky entity to change very fast with the demand of the market.

2.3 Objectives and Contents of Manufacturing Strategy:

Manufacturing function is technical in nature, and hence researchers have identified the "contents" which top management could consider while making strategic decisions. Significant work has been done to guide the top management to choose an appropriate set of priorities while planning the manufacturing function. The "contents" of the manufacturing strategy are broadly classified into two categories:

(1) Decision areas of long-term importance in the manufacturing function.
(2) Competitive priorities that help in appropriately targeting the manufacturing resources

Earlier the top management of corporations (Skinner, 1969) ignored the manufacturing function and delegated its responsibility to the manufacturing vice presidents who had dominant technical competence and little or no general management abilities. They tended to emphasize a single criterion for which they geared their manufacturing facilities and failed to correctly prioritize the different criteria in light of market conditions.

Skinner (1969) was first to point out such a state of affairs in the United States and stressed the need for developing a framework shorn of technical nut and bolts that would help the top management of manufacturing organizations in appropriately designing the manufacturing strategies. Later work by Skinner (1978), led to the identification of the following performance criteria for the manufacturing facilities: manufacturing cost per unit of output, delivery time, quality and investment in manufacturing facilities.

It was argued that to be successful a specific market segment would require a specific ordering of the priorities around which the respective manufacturing facilities would be built. Logical extension of this led Skinner (1978) to come up with plant within a plant concept (PWP for short), which essentially sought to segment the production facilities to cater to each of the market segment, so that each segment has its own set of priorities to give superior performance for a specified market segment. Each segment of productive facilities is then able to develop a unique culture that is suitable to give high performance while serving a specific market segment. It was realized that it was not possible for a particular manufacturing facility to be able to meet different performance standards. Skinner (1969) had earlier given a very useful efficiency / effectiveness interpretations of this phenomenon.

Literature on manufacturing strategy has identified different objectives of manufacturing division, which are described below. If one combines the competitive priorities of Skinner (1969, 1978, 1985), Wheelwright (1978, 1981, 1984), Buffa

(1984), Hayes and Wheelwright (1984), Fine and Hax (1985) and Hayes et al, 1988, one obtains the following six dimensions. In different sectors of economy, manufacturing plants will have different importance attached to each of these dimensions. (1) Manufacturing cost, (2) Delivery Performance, dependability and speed, (3) Quality, (4) Flexibility- product mix and volume, (5) Innovativeness and (6) Investment in productive facilities.

Other notable contributions to the manufacturing strategy literature are the plant and equipment strategy and personnel strategies. Skinner (1974) has suggested five decision areas where management makes trade-off decisions. (1) Plant and Equipment, (2) Production, Planning and Control, (3) Labor and Staffing, (4) Product engineering and design, (5) Organization and Management. Fine and Hax (1985), Hayes et al, (1988), Hayes and Wheelwright (1984) and Buffa (1984) have added other decision areas such as (6) Structural (capital spending) and infra-structural (manufacturing system and people) decisions, (7) Vertical integration (direction, extent, balance, number), (8) Technology, (9) Capacity (amount, utilization, timing), (10) Ability to introduce new products, (11) Trying to evolve a fit between product process and life cycles, (12) Information Technology (maintenance, material flows, production planning, cost tracking), (13) Customer (access, relationship, support), (14) Quality Management (definition, role, responsibility, yields), (15) New Products (integration, start-up, modification), (16) Process technologies (scale, flexibility, interconnectedness).

The works of Miles, Snow, Meyer and Coleman (1978) develops a 'static' framework that relates objectives to the decisions for a manufacturing organization. They have identified alternative ways in which organizations define their strategies and mechanisms of structure and processes to pursue these strategies. Briefly, Miles and Snow et.al (1978) have identified four broad strategy type pursued by the organization and these are. *i.) Defenders ii.) Prospectors iii.) Analyzers iv.) Reactors.*

(i) 'Defenders' have narrow and stable product domains and cost-efficient single core technology. They have low product variety, have centralized control and tendency towards high vertical integration (Miles and Snow et.al (1978), p.552).

(ii)'Prospectors' seek to maintain its reputation as an innovator in product and market development. They focus multiple technologies and have low division of labor, low formalization, have complex co-ordination mechanism, have decentralized control and have high product variety (Miles and Snow et al (1978), p. 554).

(iii)'Analyzer' in an organization is one that attempts to minimize risk while maximizing profit – i.e, an Analyzer combines the strength of both the Prospectors and Defenders. It has some version of matrix organization structure supported by intensive co-operation between functional divisions of marketing and production. It has extremely complex and expensive coordination mechanisms and it tries to achieve balance between stable and dynamic area of operation (Miles and Snow et.al. (1978), p.556).

(iv)'Reactors' exhibit a pattern of adjustment to its environment that is both inconsistent and unstable; this type lacks a set of response mechanisms which it can consistently put into effect when faced with a changing environment. As a consequence, Reactors exist in a state of almost perpetual instability. Thus, a Reactor is a "residual" strategy, arising when one of the other three strategies is improperly pursued (Miles and Snow et.al. (1978), p 557).

Thus, a manufacturing division with low product variety tends to be a defender and a manufacturing firm with high product variety would tend to be a prospector.

2.4 Categorization of corporate strategy making process:

Miller (1987) has presented a summary of different corporate strategy making process used and documented by researchers. The literature has identified three multifaceted dimensions of strategy making process: rationality, interaction and assertiveness.

2.4.1 Rationality - The first dimension, rationality, suggests careful analysis of problems and opportunities, scanning of markets, methodical planning, stress on long term objectives, use of analytical tools in strategy formulation and articulating unified strategies (Ansoff 1965, Steiner 1969). It has been referred to as synoptic by Frederickson (1984); planning by Mintzberg (1973) or rational by Miller and Frieson (1984).

2.4.2 Interaction - The second dimension of the strategy formulation process is "interaction". The name is derived from the fact that men with limited cognitive abilities make decisions while interacting with each other through the process of argumentation. Men have limited cognitive abilities and organization structure place bound on the rationality and when faced with complex problems, they only satisfice by doing little analysis and formulate strategies according to disjointed, intuitive, implicit and spontaneous process. Such a non-rational approach is necessary due to wide range of complex problems faced by the organizations and the attendant cognitive limitations and the social and political contexts in which decisions have to be made

2.4.3 Assertiveness – The third dimension of strategy making process is assertiveness that is concerned with the riskyness of strategy, reactiveness and pro-activeness of the decisions. Entrepreneurial firms act ahead of their environments by taking bold decisions (Miller & Frieson, 1984 and Mintzberg, 1973); where as more large and complex firms often act conservatively by acting only reactively to the environmental changes.

2.5 Categorization of manufacturing strategy-making process:

Strategy making process is applicable in general and hence it was proposed (Sharma 1997) that it will be applicable to the area of manufacturing as well. Hence, manufacturing strategy process can also be categorized into three dimensions, i.e. rational, interactive and assertiveness.

2.5.1 Rational - A firm pursuing a 'rational' approach to strategy making would use analytical tools such as linear programming and simulation for major marketing and financial decisions, use periodic brain storming, have formalized systematic search procedures for opportunities and use specialists for preparing reports and have a futuristic orientation. Such an approach to strategy making would lead to an integrated strategy where firm would benefit from synergy between various decisions, see Ansoff (1965). Carefully planned vertical integration and attention to technology would be corner stone of an integrated strategy driven towards cost leadership. A firm with a rational approach to strategy making would aim to limit its investments in

manufacturing resources (with a view to maximize its return on investment) by entering into joint ventures with vendors. A firm pursuing an integrated manufacturing strategy through the rational process of strategy making would extensively use the computer integrated manufacturing systems (CIMS) and lead to centralization of manufacturing facilities. A firm analyzing all possible variables and choosing a 'rational' process of manufacturing strategy is likely to have an integrated corporate and manufacturing strategies and hence have good performance in both stable and turbulent environments.

2.5.2 Interactive - A firm may choose an "interactive" approach to corporate strategy making either because it faces an uncertain environment or because it faces resource constraints, or because it faces complex internal environment. A firm pursuing an "interactive" approach to corporate strategy making process is likely to take small steps each time and hence most likely to pursue an "interaction" approach to manufacturing strategy making by investing in little to moderate quantities each time and/or making a few departures in policies relating to manufacturing divisions. A firm choosing an "interactive" and an "interaction" manufacturing strategy will most likely invest in production facilities which require moderate investment. The firm would then attempt to sell a differentiated product, which can command a relatively higher cost of production.

2.5.3 Assertiveness - An assertive manufacturing strategy would mean to bold steps with respect to manufacturing resources with investments in manufacturing facilities ahead of competitors.

2.6 Contents of manufacturing strategy:

The nine identified elements of manufacturing strategy "contents" are

(i) Organization
(ii) Facility
(iii) Capacity
(iv) Vertical Integration
(v) Scope and new products introduction
(vi) Process technologies
(vii) Human resources

(viii) Vendor relations

(ix) Production planning and control.

we discuss these below:

2.6.1 Organization - Organization structure and strategy making are highly interdependent and must be complementary in many ways to ensure good performance Aspects of organization structure are integration, formalization, specialization, standardization, centralization and complexity of workflow.

Integrative liaison devices like task forces and committees can encourage rationality in decision-making. They precipitate contact among decision-makers that may motivate systematic attempts to develop, scrutinize and reconcile divergent perspectives. Integrative devices can also induce interaction. Committees increase face-to-fact contacts among managers. They promote consultation, useful exchange of information and worthwhile debate. Integrative devices also increase assertiveness, uniting the perspectives of decision-makers and emboldening them to make decisive and proactive decisions. Formalization leads to the use of formal procedures and job descriptions, cost and quality controls, specialists and professional technocrats increase analytical capabilities and expertise needed for systematic and overtly rational modes of decision making. Specialization and technocratization involve many managers in any given issue and thus can induce highly interactive decision-making. Formalization of policies and procedures however reduce assertiveness. People may ignore decision-making stimuli that no formal system monitors so their firms respond only to obvious and pressing problems.

Centralization discourages rationality by placing most of the onus of decision-making on top executives. It impedes analysis and planning. It also diminishes a felt need for interaction by inducing conformity in methods and goals via power structures rather than through discussion. Centralization can free top managers to be assertive-venturesome and proactive because they have more power to commit significant resource to a project. It is possible that assertiveness is less hazardous in the context of a decentralized structure, where decision-making is a participatory endeavor Miller (1987) gave the above relationship.

2.6.2 Facility – Firm can choose multiple facilities or target to have a large integrated single facility. Size of facilities and their focus can be different. Firms with interaction process of manufacturing strategies are likely to have multiple facilities of production and for each of these facilities they are likely to follow interaction changes in policies. Disadvantages of incrementallism such as lack of integration etc. will sought to be reduced by having multi-plant strategy. Integrated manufacturing strategy process will tend to seek economies of scale of various kinds. Firms with bold manufacturing strategies could have either single of multiple plants. We are unable to formulate relationship between bold process of manufacturing strategy and facilities choice. Firms with single facilities shall tend to reduce risks by having cost advantage; whereas firms with multiple plants shall reduce risks by competing in multi-product markets.

2.6.3 Capacity – Firms following interaction process of strategy making will not hold excess capacity as they change capacities in an "incremental" fashion. Firms following integrated process of manufacturing strategy will add capacity in large quantum to gain advantages of economies of scale and learning curve effects. Firms following bold process of manufacturing strategy will add huge capacities much ahead of demand.

2.6.4 Vertical Integration – Firms' chosen "generic strategy" affects its vertical integration decisions. Firms pursuing "cost leadership" strategy are likely to have higher level of vertical integration. Firms with "differentiation" strategy are likely to have lower level of vertical integration. Firms with bold process of manufacturing strategy making will emphasize flexibility and as a result have moderate vertical integration.

2.6.5 Scope and New Products – Firms with interaction process of strategy making have general capability productive facilities and hence are able to introduce new products into the market. But since a lot of time is spent in consultations before any decision is taken they are expected to have low score on new product introductions. Firms with integrated process of manufacturing strategy-making have productive facilities with specific capabilities and hence are able to introduce products with

highly similar features. Firms with bold process of manufacturing strategies have the capability to introduce new products frequently.

2.6.6 Process Technologies – It was felt that strategy-making process has relatively no influence on the choice of old or new process technologies chosen by the firm

2.6.7 Human Resources - Human resource policy is a multidimensional concept. We limit ourselves to the aspect of degree of training. Firms with "cost leadership" strategy are likely to give high training to their workers and encourage specialization Since most of the machines are automated and most of quality is built into machines, workers skill is relatively less. Firms with "differentiation" strategy have machines with general capabilities require workers to be highly skilled.

2.6.8 Vendor Relations – Vendor relations depend on the relative bargaining power of suppliers. If firm is highly integrated or has high level of vertical integration, then its dependence on suppliers is less and hence it has better bargaining power vis-à-vis suppliers. But to gain advantage of better responsiveness it can promote "co-operative" relationship with vendors. However, a firm with low vertical integration has little bargaining power vis-à-vis suppliers and may be forced to have "competitive" relationship with the suppliers.

2.6.9 Production Planning and Control – It has multiple aspects and no hypothesis has been framed in this regard

CHAPTER – 3

CONCEPTUAL FRAMEWORK

3.1 Relating Manufacturing Objectives and Decisions in static case:

Framework that expands the ideas given by Miles and Snow et-al (1978) and relates objectives to manufacturing decisions is given in tables 1 and 2. It may be noted here that this framework is the corrected version of the framework presented by Behera (2000). Reddy (1999) had used common sense approach to develop the hypotheses, which were used by Behera (2000). However, we have given literature review that led to modification of these hypotheses. Some of the hypotheses used by Behera (2000) that relate objectives of manufacturing organization to its organization structure have been revised and modified according to the ideas given by Miles and Snow et-al (1978). These corrected versions have been given in tables 1 and 2.

3.2 Changes involved in manufacturing decisions in dynamic cases:

In static cases, the manufacturing decisions are taken to lead to full achievement of manufacturing objectives. When objectives of the manufacturing department themselves changes, one has to change the manufacturing decisions once again to achieve maximum effectiveness. Twenty-eight change cases were identified when manufacturing objectives change on one or more of the dimensions of product variety, delivery performance and volume flexibility. The manufacturing decisions on plant and equipment, labor and vertical integration are termed as hard decisions whereas, those on PPC, organization structure and vendor relations are called soft decisions.

We thus see that out of twenty-eight dynamic cases, in eight cases the transition is easy to achieve, in four cases transition is moderately difficult to achieve and in sixteen cases transition is very difficult to achieve.

We argue that when changes in manufacturing decisions are difficult to achieve, the changes would be resisted and in such cases the manufacturing strategy will drive the corporate strategy; and when the changes are easy to achieve, the corporate strategy will drive the manufacturing strategy (as has been the conventional wisdom). Before investing in manufacturing resources, management must carefully analyze any future changes required in manufacturing divisions' objectives If a difficult change path is seen then management must resort to appropriate pricing policies to recover investments quickly or else avoid investments in such risky environments.

The table of changes in manufacturing decisions that are related to changes in objectives is given in table 3.

Table No.1

Framework that relates objectives and decisions of manufacturing organizations (except organization structure)

S.No.	Objectives of Manufacturing Division	Plant and Equipment	Production Planning & Control (PPC)	Labor Skill	Vertical Integration	Vendor Relationship
S1	Product Variety -low Delivery Performance-low Volume Flexibility -low	Special purpose equipment (SPM) Large capacity to have economics of scale.	Scheduling is not difficult. Focus on minimizing labor cost and wastage. PPC group does not have important role to play	Low skill Levels; able to handle jobs of a same kind only.	High	Since vertical integration is high, there is low dependence on vendors and hence co-operative relationship with vendors
S2	Product Variety -low Delivery Performance -low Volume Flexibility -High	Special purpose equipment; Flow Lines; Excess buffer capacity.	PPC does not have important role to play.	Low skill Levels	High	Due to increased volume fluctuations, dependence on vendors increases. Their bargaining power is relatively higher than as in case 1. Hence firms goes in for co-operative relationship with vendors.
S3	Product Variety -High Delivery Performance -low Volume Flexibility -low	General purpose machines. (GPM)	With multiple products and GPM's , reducing set up time is important and scheduling is an important activity. PPC group has an important role to play.	Low division of labor; required to handle variety of jobs; hence are multi-skilled.	With multiple products inhouse development of large number of parts not possible and Vertical integration is low.	Since speedy deliveries are not important, firms can have multiple factors for a single part and have competitive relationship with vendors.

S4	Product Variety -High Delivery Performance -low Volume Flexibility -High	GPM's ; Little inventories; organize their machines flow lines	Scheduling is important. PPC has important role to play.	High Product Variety, Labor is multi skilled.	Low vertical integration.	With many bought out items, vendors have high bargaining power and hence firm would have competitive relations with vendors.
S5	Product Variety -low Delivery Performance -High Volume Flexibility -low	SPM's used. Firm would produce to stock and large buffers will be maintained.	Low importance	Skill level will be low	High vertical integration.	Co-operative relationship with vendors.
S6	Product Variety -low Delivery Performance -High Volume Flexibility -High	SPM's used. Higher Investment in capacity as vol. flexibility is high. Large buffer inventory to meet high delivery performance.	Low importance	Skill level will be low	High vertical integration	Co-operative relationship with vendors
S7	Product Variety -High Delivery Performance -High Volume Flexibility -low	GPM's. Large inventories in general FMS is encouraged	High importance	Workers capable of handling many products.	High product variety forces low Vertical integration. High delivery per. forces to use JIT kind of purchasing strategy.	Firms bargaining power vis-à-vis vendors is low and hence firm goes in for competitive relationship with vendors.
S8	Product Variety -High Delivery Performance -High Volume Flexibility -High	GPM's is general but FMS is ideally suited.	Important	Multi-skilled labor	Low vertical integration.	Vendors are powerful vis-à-vis the firm & hence firm goes in for competitive relationship.

Table No. 2

Framework that relates objectives of manufacturing organization to its organization structure

S.No.	Objectives of Manufacturing Division	Specialization	Standardization	Formalization	Centralization	Complexity of Work flow
S1	Product Variety -low Delivery Performance -low Volume Flexibility -low	High	High	High	High	Low
S2	Product Variety -low Delivery Performance -low Volume Flexibility -High	High	High	High	High	Low
S3	Product Variety -High Delivery Performance -low Volume Flexibility -low	Low	Low	Low	Low	High
S4	Product Variety -High Delivery Performance -low Volume Flexibility -High	Low	Low	Low	Low	High
S5	Product Variety -low Delivery Performance -High Volume Flexibility -low	High	High	High	High	Low
S6	Product Variety -low Delivery Performance -High Volume Flexibility -High	High	High	High	High	Low
S7	Product Variety -High Delivery Performance -High Volume Flexibility -low	Low	Low	Low	Low	High
S8	Product Variety -High Delivery Performance -High Volume Flexibility -High	Low	Low	Low	Low	High

Table No. 3

Summary of changes in manufacturing decisions due to changes in objectives of the manufacturing departments

No.	Initial set of obj.	Final set of obj.	Plant and equipment	PPC	Labor Skills	Vertical Integration	Vendor Relations	Organization Structure	Overall difficulty of change
D1	S1	S2	Installation of flow lines, more stress on inv	-	-	-	-	-	Moderate Difficulty of change
D2	S1	S3	SPM's to GPM's	Low imp To high imp	Low to high skills	High to low	Low to high BP of vendors	Drastic changes on all dim	Most difficult to change
D3	S1	S4	SPM's to GPM's	Low imp To high imp	Low to high skills	High to low	Low to high BP of vendors	Drastic changes on all dim	Most difficult to change
D4	S1	S5	-	-	-	-	-	-	Easy to change
D5	S1	S6	High capacity SPM's to large dependence on high inv	-	-	-	-	Minor changes in centralization dimension	Moderate difficulty
D6	S1	S7	SPM's to GPM's	Low to high imp.	Low to high skills	High to low	Low to high BP of vendors	Drastic changes on all dim	Most difficult to change
D7	S1	S8	SPM's to GPM's	Low to high imp.	Low to high skills	High to low	Low to high BP of vendors	Drastic changes on all dim	Most difficult to change
D8	S2	S3	SPM's with high inv. To GPM's and low inv.	Low to high imp.	Low to high skills	High to low	Moderate to high BP of vendors	Drastic changes on all dim.	Most difficult to change
D9	S2	S4	SPM's to GPM's	Low to high imp	Low to high skills	Moderate high to low.	Moderate to high BP of vendors	Drastic changes on all dim	Most difficult to change
D10	S2	S5	-	-	-	-	-	Minor changes	Easy to achieve
D11	S2	S6	High capacity SPM's and large dependence on inv	-	-	-	-	Minor changes in centralization	Moderately difficult
D12	S2	S7	SPM's to GPM's with large inv Or FMS	Low to high imp	Low to high skills	High to low	Low to high BP of vendors	Drastic changes on all dimensions	Most difficult to change
D13	S2	S8	SPM's to GPM's	Low to high imp	Low to high skills	Moderate high to low.	Moderate to high BP of vendors	Drastic changes on all dim	Most difficult to change
D14	S3	S4	-	-	-	-	-	-	Easy to achieve
D15	S3	S5	GPM's to SPM's	High to low imp	High to low skills	Low to high	High to low B P. of vendors	Drastic changes on all dimensions	Most difficult change
D16	S3	S6	GPM's to SPM's	High to low imp.	High to low skills	Low to high	High to low B P. of vendors	Drastic changes on all dimensions	Most difficult change
D17	S3	S7	-	-	-	-	-	-	Easy to change.
D18	S3	S8	Higher capacity GPM's production to stock	-	-	-	-	-	Moderate difficulty.
D19	S4	S5	GPM's to SPM's	High to low imp	High to low skills	Low to high	High to low B.P of vendors	Drastic changes on all dimensions	Most difficult to achieve
D20	S4	S6	GPM's to SPM's	High to low imp.	High to low skills	Low to high	High to low B P of vendors	Drastic changes on all dimensions	Most difficult to achieve
D21	S4	S7	-	-	-	-	-	-	Easy to change

D22	S4	S8	-	-	-	-	-	-	Easy to change
D23	S5	S6	-	-	-	-	-	-	Easy to change
D24	S5	S7	SPM's to GPM's	Low to high imp	Low to high skills	High to low	Low to high BP of vendors	Drastic changes on all dim	Most difficult to change
D25	S5	S8	SPM's to GPM's	Low to high imp	Low to high skills	High to low	Low to high BP of vendors	Drastic changes on all dimensions	Most difficult to change
D26	S6	S7	SPM's to GPM's	Low to high imp	Low to high skills	High to low	Low to high BP of vendors	Drastic changes on all dimensions	Most difficult to achieve
D27	S6	S8	SPM's to GPM's	Low to high imp	Low to high skills	High to low	Low to high BP of vendors	Drastic changes on all dimensions	Most difficult to change
D28	S7	S8	-	-	-	-	-	-	Easy to change

- Changes that are easy to achieve 8
- Changes with moderate difficulty 4
- Most difficult changes 16
- Total cases 28

3.3 Relating Manufacturing Objectives, Dimensions of Organization Structure and Manufacturing Strategy Making Process:

Based on the studies of Miles and Snow et-al (1978) and Miller (1987), we have formulated a conceptual framework that relates objectives, dimensions of organization structure and manufacturing strategy-making process. Miles and Snow et-al (1978) have identified alternative ways in which organizations define their strategies and mechanisms of structure and process to pursue these strategies. Briefly, Miles and Snow et-al (1978) have identified four broad strategy type pursued by the organization and these are: i.) Defenders ii.) Prospectors iii.) Analyzers iv.) Reactors. Defenders have narrow and stable product domains and cost-efficient single core technology. They have low product variety, have centralized control and tendency towards high vertical integration. (Miles and Snow et-al (1978), p.52) Prospectors seek to maintain its reputation as an innovator in product and market development. They focus multiple technologies and have low division of labor, low formalization, have complex co-ordination mechanism, have decentralized control and have high product variety (Miles and Snow et-al (1978), p. 554). A true analyzer is an organization that attempts to minimize risk while maximizing profit – i.e., an analyzer combines the strength of both the prospectors and defenders. It has some version of matrix organization structure supported by intensive co-operation between functional divisions of marketing and production. It has extremely complex and expensive coordination mechanisms and it tries to achieve balance between stable and dynamic area of operation. (Miles and Snow et-al. (1978), p.556). Thus, a manufacturing division with low product variety tends to be a defender and a manufacturing firm with high product variety would tend to be a prospector.

Miller (1987), on the other hand has developed hypotheses that relate Strategy Making to Structure. These hypotheses have been summarized in table 4 and a conceptual framework that relates objectives, dimensions of organization structure and manufacturing strategy making process has been summarized in table 5, based on these two works of Miles and Snow et-al (1978) and Miller (1987).

Table No.4

Relating Manufacturing strategy Making Process to Organization Structure

Organization Structure Dimensions	Manufacturing Strategy Making Process		
	Rational	Interaction	Assertiveness
• Formalization	+	+	-
• Centralization	-	-	+
• Complexity of Workflow	+		-

Table No.5

Relating Objectives, Dimensions of Organization Structure and Manufacturing Strategy Making Process

Objective of Manufacturing Decision	Dimensions of Organization Structure		Manufacturing Strategy Making Process
High Product Variety (Prospector)	Specialization	– Low	
	Standardization	– Low	
	Formalization	– Low	⟹ Assertiveness
	Centralization	– Low	⟹ Rational & Interaction
	Complexity of Workflow	– High	⟹ Rationality
Low Product Variety (Defender)	Specialization	– High	
	Standardization	– High	
	Formalization	– High	⟹ Rational & Interaction
	Centralization	– High	⟹ Assertiveness
	Complexity of Workflow	– Low	

CHAPTER – 4

METHODOLOGY & ANALYSIS OF DATA

In this chapter we have given the details of the process through which we have verified the hypothesis given in chapter 3. We studied a firms' past and present manufacturing objectives and manufacturing decisions they made on various dimensions such as organization structure, vendor relations, vertical integration, plant and equipment, labor skills and production planning and control.

Initially, we had made a pilot survey from the questionnaire prepared by us for two or three companies. From the suggestions made by the production managers and other personnel we made the necessary modifications in the questionnaire. For knowing the initial (five to seven years back) and final stage objectives, we have relied both on the questionnaire and the interviews with the manufacturing departments. The questionnaire is given in appendix.

4.1 Organization of the questionnaire:

For the data collection, we formulated three sets of questionnaires. The first questionnaire has been divided into four parts. Part I contains the details of the name of the company, products produced by it and the details of the personnel to which we had visited. Part II gives the details of the objectives made by the company five to seven years back and the present objectives. We have also scaled the objectives (1-7 scale), at which they rate their present and the past objectives and from which we had inferred whether the company had gone through any change in their objectives. Part III of it gives the details of the type of production planning and control done, level of automation, vertical integration, vendor relations etc. In the production planning and control (PPC) group, the type of planning used by the plant and the type of inventory management system followed by it was studied. For studying the labor skills, the type of labor hired by the company and the training provided to them are studied. For the

vertical integration, the value of in-house production and the value of assemblies purchased by the company from the outside vendors were taken from the data. For knowing the vendor relations, the number of vendors per product and the type of relationship with the vendor (Vendor not important, Competitive, Cooperative) is measured Part IV is meant for studying the organization structure. Here, we have studied the various aspects of the organization structure like:

Standardization – *the level of use of standard procedure in the plant,*
Specialization – *the level of use of specialized jobs for the organization,*
Formalization – *the level of the use of documented procedures in the organization,*
Centralization – *the level of use of authority in the organization,*
Complexity of workflow – *the interaction level among various departments*

For measurement of each of these structure objectives a standard scale has been prepared (scale of 1-7). This standard scale was borrowed from the paper " *Dimension of Organization Structure",* by P.S Pugh et-al, published in the Administrative Science Quarterly (1968).

The second questionnaire measures the Corporate Strategy Making Process. The questions have been formulated to measure the three multifaceted dimensions of strategy making process: rationality, interaction and assertiveness. The scale has been borrowed from Danny Miller's paper *"Strategy making and Structure: Analysis and implications for performance"*, published in Academy of Management Journal, 1987, Vol. 30, No.1, 7-32.

The third questionnaire measures the Manufacturing Strategy Making Process. The questionnaire is a modified version of the above-mentioned questionnaire that measures the corporate strategy making process. The questions have been formulated to measure the three multifaceted dimensions of strategy making process: rationality, interaction and assertiveness. The second and third questionnaire evaluates that how far is the manufacturing strategy making process is in tune with the corporate strategy making process. These two together drive the overall strategy making process within the organization.

4.2 Data Collection and Analysis:

Reddy (1999) and Behera (2000) had developed a theoretical framework and hypothesis for the static and dynamic models Taking the three objectives i e product variety, volume flexibility and delivery performance we have developed eight static models From these eight static models, by taking different permutations and making the prospective changes in the Reddy's (1999) and Behera's (2000) work we have developed twenty-eight dynamic cases Reddy (1999) had used common sense approach to develop hypothesis, which were used by Behera (2000) However, we have given literature review that led to modification of these hypotheses and was given in the conceptual framework developed in chapter 3

To validate these cases, two methods can be applied, either the questionnaire survey or the case study. Questionnaire survey is less costly than the case study and more samples can be collected for that case in lesser time. Again, due to the diverse statements and many dynamic cases it requires a lot of sample to validate the theoretical framework. Data was collected from German firms and the data of Indian firms was borrowed from the works of Behera (2000), Reddy (1999) and Upadhyay (1997)

In the questionnaire-based study, a moderate sample size was taken for validating the framework To validate the huge number of the dynamic cases there were very few samples for the dynamic cases. Therefore, the use of statistical tool is limited. Hence, we have gone for pure analysis from the data and the responses received Every attempt was made to choose the sample companies as diverse as possible Due to the very few number of samples, it was not possible to cover each and every aspect of the framework. We have gathered data on 14 manufacturing firms in Germany and 42 manufacturing firms in India to find substantial support for the theoretical framework developed in this thesis.

The forthcoming tables 6,7,8 & 9 show the data for the various German and Indian Manufacturing firms.

Table No. 6

Actual field data from German Manufacturing Firms

S.NO.	Initial set of obj.	Final set of obj.	Dynamic case	Plant and equip. (SPM : GPM)	PPC	Labor skills	Vertical integration	Vendor relation
GC1	S5	S6	D 23	70 30	Scheduling, Classical Production & Inventory system	Low skilled	70% in house value addition.	avg 2 vendors/part
				75 25	Scheduling, MRP	Semi-skilled	70% in house value addition	Cooperative relation with vendor 2 vendors/part
GC2	S6	S8	D 27	50 50	Low imp	High skilled	60% in house value addition.	Competitive relation with vendor and had 25 vendors/part
				20 80	Scheduling has become important now	Multi skilled	60% in house value addition	Competitive relation with vendor 17 vendors/part
GC3	S8	S8	Static Case	15 · 85	High importance	Moderately high skilled	90% in house value addition	Cooperative relation with vendor 1 vendor/part
				45 55	High importance. Scheduling and JIT	Multi skilled with high training	85% in house value addition	Little more Competitive relation with vendor . 3 vendors/part.
GC4	S7	S8	D 28	20 80	Used MRP kind of inv system and scheduling was important	Semi-skilled with moderate training	50% in house value addition	Cooperative relation with vendor 2 vendors /part
				30 · 70	Scheduling and MRP	High skilled labor with high training	60% in house value addition.	Cooperative relation with vendor 2 vendors/part
GC5	S5	S8	D 25	Data not Available	JIT inventory system	Semiskilled with high training	Data not available	Data not Available
				Data not Available	JIT inventory system	High skilled with high training	Data not available	Data not Available
GC6	S5	S5	Static case	100 . 0	Scheduling; Classical Production & Inventory system	High skilled labor	100% in house value addition	Cooperative relation with vendor. 2 vendors/part
				100 0	Scheduling, Classical Production & Inventory system	High skilled labor	100% in house value addition	Cooperative relation with vendor. 2 vendors/part.
GC7	S8	S6	RD 27	50 50	Scheduling; Classical Production & Inventory system	Multi skilled with high training	80% in house value addition	Competitive relation with vendor 7 vendors /part
				80 20	Scheduling; Kanban system	Multi skilled with high training	60% in house value addition	Even more Competitive relation with vendor 10 vendors /part

GC8	S7	S8	D 28	30 70	Scheduling, Classical Production & Inventory system	Semi skilled with moderate training	25% in-house value addition	Competitive relation with vendor 4 vendors /part
				25 75	Scheduling, MRP	High skilled with high training	25% in-house value addition	Competitive relation with vendor 4 vendors /part
GC9	S8	S8	Static case	10 90	Scheduling, MRP	Multi skilled with high training	80% in-house value addition	Competitive relation with vendor 3 vendors /part
				10 90	Scheduling, MRP & JIT	Multi skilled with very high training	80% in-house value addition	Competitive relation with vendor 3 vendors/part
GC10	S8	S8	Static case	20 80	Not very important Classical Production & Inventory System	Multi skilled with moderate training	20% in-house value addition	Competitive relation with vendor 10 vendors/part
				20 80	Scheduling, Classical Production & Inventory system	Multi skilled with moderate training	20% in-house value addition.	Competitive relation with vendor 8 vendors/part
GC11	S8	S8	Static case	Data not available	Scheduling, Classical Production & Inventory system	Semi skilled to High skilled	Data not available	Cooperative relation with vendor 1 vendor/part
				Data not available	Scheduling, Classical Production & Inventory system	Semi skilled to High skilled	Data not available	Competitive relation with vendor 5 vendors/part
GC12	S7	S7	Static case	Data not available	Scheduling, MRP	Multi skilled with high training	Data not available	Cooperative as well as Competitive relations with vendors
				Data not available	Scheduling; MRP	Multi skilled with high training	Data not available	Cooperative as well as Competitive relations with vendors
GC13	S8	S8	Static case	10 . 90	Scheduling; MRP	High skilled with very high training	50% in-house value addition	Competitive relation with vendor 6 vendors/part
				5 : 95	Scheduling, MRP as well as JIT	High skilled with high training	35% in-house value addition	Competitive relation with vendor 8 vendors/part
GC14	S8	S8	Static case	0 · 100	Scheduling, Classical Production & Inventory system	High skilled with moderate training	50% in-house value addition	Competitive relation with vendor. 10 vendors/part
				0 100	Scheduling, Classical Production & Inventory system	High skilled with high training	60% in-house value addition	Competitive relation with vendor. 20 vendors/part

Table No. 7

Organization Structure scores on various dimensions for German Manufacturing Firms (Scale 1-7)

S.No.	Specialization	Standardization	Formalization	Centralization	Complexity of workflow
GC1	3 5	6 33	5 73	3 94	4
	3 63	6 44	6	3 88	4
	|t|=0 39 significant at α > 0 8	|t|=0 46 significant at α > 0 8	|t|=0 71 significant at α > 0 5	|t|=0 79 significant at α > 0 5	|t|=0
GC2	5 38	4 44	6 33	4 93	7
	538	4 67	6 33	4 93	7
	|t|=0	|t|=0 21 significant at α > 0 8	|t|=0	|t|=0	|t|=0
GC3	3 75	4 67	6	4 36	6
	3 88	5 77	6 45	4 39	6
	|t|=0.12 significant at α > 0 5	|t|=1 2 significant at α > 0 5	|t|=1 46 significant at α > 0 2	|t|=0 16 significant at α > 0 8	|t|=0
GC4	3 63	4 22	3.91	4.70	4
	4 13	5 89	4 73	4 70	5
	|t|=0 69 significant at α > 0 5	|t|=2 75 significant at α > 0 2	|t|=3 80 significant at α > 0 01	|t|=0	|t|=2 45 significant at α > 0 1
GC5	5 14	4 75	4.9	5 69	4
	5 14	4 75	5	5 69	4
	|t|=0	|t|=0	|t|=0.199 significant at α > 0.8	|t|=0	|t|=0
GC6	3.88	4 66	6.27	4 97	4
	4 38	5	6 45	4 75	6
	|t|=0.42 significant at α > 0 8	|t|=0.38 significant at α > 0 8	|t|=0.4 significant at α > 0 8	|t|=1.09 significant at α > 0 5	|t|=2 significant at α > 0 5
GC7	5 75	5 67	6 45	4.75	4.5
	5 5	6	6	4.59	6.5
	|t|=0 31 significant at α > 0 8	|t|=0 39 significant at α > 0 8	|t|=0 77 significant at α > 0 5	|t|=2.44 significant at α > 0 02	|t|=2.83 significant at α > 0 05
GC8	5 75	5 44	5.73	4 31	5.25
	6 25	5 67	5 91	4 29	6
	|t|=0 82 significant at α > 0 5	|t|=0 41 significant at α > 0 8	|t|=0..39 significant at α > 0 8	|t|=0 095 significant at α > 0 8	|t|=3 significant at α > 0 1
GC9	5	5 89	5 7	4 64	4
	5	5.89	5.7	4 64	4
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0

GC10	5	4 67	6 36	4 88	4
	5 25	4 67	6 36	4 88	6
	|t|=0 26 significant at $\alpha > 0\ 8$	|t|=0	|t|=0	|t|=0	|t|=3 significant at $\alpha > 0\ 1$
GC11	5 17	5 44	6 4	4 44	4 25
	6	555	6 3	4 44	5 75
	|t|=0 697 significant at $\alpha > 0\ 8$	|t|=0 26 significant at $\alpha > 0\ 8$	|t|=0 23 significant at $\alpha > 0\ 8$	|t|=0	|t|=4 24 significant at $\alpha > 0\ 01$
GC12	3 88	5 5	5 36	2 91	5
	3 88	5 5	5 36	2 91	5
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0
GC13	3 88	6 15	6 27	4 06	5 25
	5	6 15	6.45	3 72	6
	|t|=1 57 significant at $\alpha > 0\ 2$	|t|=0	|t|=0 46 significant at $\alpha > 0\ 8$	|t|=1 48 significant at $\alpha > 0\ 2$	|t|=0.88 significant at $\alpha > 0\ 5$
GC14	3.75	4 33	3 73	4 69	4
	4	5 88	4 73	4 69	5 5
	|t|=0 27 significant at $\alpha > 0\ 8$	|t|=2 02 significant at $\alpha > 0\ 1$	|t|=3.63 significant at $\alpha > 0\ 01$	|t|=0	|t|=5 19 significant at $\alpha > 0\ 02$

Comments on changes

Case 1 : Easy to change

Good support to hypotheses on manufacturing decisions and organization structure except for specialization and complexity of workflow. These deviations from the hypotheses could not be verified.

Case 2 : Most difficult to change

Good support to hypotheses on manufacturing decisions except for high score on vertical integration. The company had used many Plants within a Plant (PWP) and hence the scores on specialization, standardization, formalization and centralization are high. The score on complexity of workflow is also high which remains an unexplained case.

Case 3 : Static case

Due to high tech nature of the business, the firm has high vertical integration and due to business expansion the company has put in more SPM's. They are monopolists in their class of business. The firm has medium level of standardization, but very high

level of formalization (which is not in tune with hypothesis) and medium level of centralization. These high scores are due to the fact that the company has Plant within a Plant (PWP) concept. The score on centralization is likely to be high due to the fact that it is a small enterprise. Overall, there is a reasonable support to the hypothesis on manufacturing decisions as well as organization structure.

Case 4 : Easy to change

Reasonable support to the hypotheses on manufacturing decisions but poor support to hypotheses on organization structure. These deviations from the hypotheses for the organization structure scores could not be verified.

Case 5 : Most difficult to change

Most of the data on manufacturing decisions is not available. For the initial objectives, good support to the hypotheses on organization structure. For the final objectives, poor support to the hypotheses on organization structure. Here, the centralization score is high because of the organization being a small enterprise and the owner may have a desire for power and control.

Case 6 : Static case

Good support to hypotheses on manufacturing decisions and organization structure except for the complexity of workflow.

Case 7 : Most difficult to change

You cannot fire workers as objectives change. Hence, firm continues to have high skilled labor. This is an interesting case as there was a change in management of the organization. The final organization structure dimensions were aligned to previous objectives (S8) and went through no changes except complexity of workflow.

Case 8 : Easy to change

Good support to hypotheses on manufacturing decisions. The company had used many Plants within a Plant (PWP) and hence the scores on specialization, standardization, formalization and centralization are high. The score on complexity of workflow is also high which remains an unexplained case.

Case 9 : Static case

It is high tech company; hence, vertical integration is high. Poor score on organization structure dimensions except for the complexity of workflow. These deviations from the hypotheses for the organization structure scores could not be verified.

Case 10 : Static case

Good alignment in manufacturing decisions. The company had used many Plants within a Plant (PWP) and hence the scores on specialization, standardization, formalization and centralization are high. The score on complexity of workflow is not in tune with the theory and it remains as an unexplained case.

Case 11 : Static case

Data not available for manufacturing decisions. The company had used many Plants within a Plant (PWP) and hence the scores on specialization, standardization, formalization and centralization are high. The score on complexity of workflow is not in tune with the theory and it remains as an unexplained case.

Case 12 : Static case

Data not available for manufacturing decisions. The company had used many Plants within a Plant (PWP) and hence the scores on standardization and formalization are high. The scores on centralization and complexity of workflow are not in tune with the theory and this remains as an unexplained case.

Case 13 : Static case

Good support to hypotheses on manufacturing decisions. The company had used many Plants within a Plant (PWP) and hence the scores on specialization, standardization, formalization and centralization are high for the initial objectives. For the final objectives the score on centralization is not in tune with the theory. The score on complexity of workflow is not in tune for the initial as well as final objectives.

Case 14 : Static case

Good support to hypotheses on manufacturing decisions. Poor alignment on organization structure scores. Here, the centralization score may be high because of the organization being a medium scale enterprise and the owner may have a desire for power and control. The score on complexity of workflow is in tune with the theory.

Table No. 8

Actual field data from Indian Manufacturing firms

S.NO.	Initial set of obj.	Final set of obj.	Dynamic case	Plant and equip. (SPM : GPM)	PPC	Labor skills	Vertical integration	Vendor relation
IC1	S6	S8	D27	65 35	Low importance	Low skilled	50% in house value addition	BP of vendors was high, avg 3 vendors/part
				40 60	High importance	Skilled with lot of training for them	30% in house value addition	BP is even higher
IC2	S1	S6	D5	100 0	Low importance	Low skilled	40% in house value added low support for S1.	High BP of vendor, so they went for competitive relation with vendor and had 3 vendors/part Low support for S1
				100 0 they keep more inv now	Scheduling has become important now	Low skilled	40% in house value addition	Now they go for 4 vendors/product, poor support for our hypothesis.
IC3	S5	S5	Static case	70 30	Moderate importance	Moderately high skilled	40% in house value addition	Delivery performance is high, go for 2 vendors/part
IC4	S1	S8	D7	100 0	Used MRP kind of inv system and scheduling was imp due to large imports	Semi-skilled earlier	Did not disclose but it is low earlier	1 vendor /part or product
				15 · 85	PPC is an imp. group.	Multi and high skilled labor is hired now.	Data not available	BP of vendor is more now, they have 3 vendors/part
IC5	S2	S7	D12	60 40	Due to high flex. reqd PPC had moderate importance	Semiskilled	65% in house value addition High V I moderate support	2 vendors/product
				50 . 50	High importance	Multi skilled labor	60% is the in-house value addition.	2 vendors/product
IC6	S7	S8	D28	30 70	Moderate importance	Semi-skilled labor	30% is the in-house value addition	4 vendors/product
				25 75	High importance	Semi-skilled labor	30% is the in-house value addition	4 vendors/product
IC7	S8	S5	RD25	40 · 60	High importance	Semiskilled with low training. low support	60% is the in-house value addition	3 vendors/product.
				70 30	Less importance	Low skilled people.	50% is the in-house value addition	3 vendors/product
IC8	S5	S6	D23	75 25	Low importance	Low skills	60% in-house value addition	3-4 vendors/ products
				75 25	High importance	Moderate skills	70% in-house value addition	3-4 vendors/ products
IC9	S2	S6	D11	100 0	Due to vol fluctuation low importance	Unskilled labor	65% in-house value addition	3-4 vendors/ products
				100 0	Gained some importance now.	Low skill labor	80% in-house value addition	Co-operative relation, 1-2 vendors/product

IC10	S7	S8	D28	Using FMS 30 70	High importance	Semiskilled workers	40% in-house value addition	2 vendors/product
				30 70	High importance	Semiskilled workers	50% is the in-house value addition	1 vendors/product
IC11	S1	S5	D4	100 0	No PPC group	Semiskilled workers	70% in-house value addition	3-4 vendors/ products
				100 0	No PPC group	Semiskilled workers	70% in-house value addition	3-4 vendors/ products
IC12	S8	S5	RD25	0 100	Very important	Moderately skilled , high training provided	40% in-house value addition	4 vendors/product
				0 100	No importance, scheduling etc is not imp	Moderately skilled , high training provided	70% in-house value addition	4 vendors/product
IC13	S4	S8	D22	0 100	High importance	Multi skilled labor	80% in-house value addition	3-4 vendors/ products
				0 100	High importance	Multi skilled labor	80% in-house value addition	3-4 vendors/ products
IC14	S7	S7	Static case	15 85	High importance to PPC	Semi and low skilled with moderate training	45% in- house value addition	3 vendors/product with cooperative relationship
IC15	S8	S1	RD7	2 · 98	High importance	Semi skilled	30% in-house value addition	4 vendors/product
				2 : 98	Not much importance	Semi skilled	20% in-house value addition	1vendor/product
IC16	S3	S8	D18	0 100	Moderately important	Highly skilled	50% is the in-house value addition	2 vendors/product
				0 100 Using buffer stock also	Very important	Highly skilled	50% is the in-house value addition	3 vendors/product
IC17	S3	S7	D17	Predominately GPM's with flow lines	Low importance	Moderately skilled	70% in-house value addition	3 vendors/product
				Predominately GPM's with flow lines	Now has much more importance	Moderately skilled	55% is the in-house value addition	JIT philosophy being adopted
IC18	S3	S7	D17	30 . 70	Strong PPC group	Moderately skilled	5% is the in-house value addition.	Only 30% are dedicated vendors
				30 : 70	Strong PPC group	Few multi skilled workers are added	Not available	Not available
IC19	S4	S5	D19	20 : 80	Moderate important	Moderately skilled labor	40% in-house value addition	3-4 vendors/ products
				20 · 80	Moderate important	Moderately skilled labor	40% in-house value addition	3-4 vendors/ products
IC20	S3	S7	D17	30 . 70	Most important	Multi skilled	40% in-house value addition	3-4 vendors/ products
				30 70	Most important	Multi skilled	40% in-house value addition	Efforts for dedicated vendors. But still 3-4 vendors/product
IC21	S7	S7	Static case	5 : 95	Highly important	Highly Skilled	40% in-house value addition	Co-operative relation with vendors.
IC22	S7	S7	Static case	10 90	Highly important	Moderately skilled	30% in-house value addition	3-4 vendors/ products

Table No. 9

Organization Structure scores on various dimensions for Indian Manufacturing Firms

S.No.	Specialization	Standardization	Formalization	Centralization	Complexity of workflow
IC1	4 28	4 67	4 78	5 24	4 25
	4 71	5 0	4 78	5 24	4 25
	|t|=0 56 significant at α > 0 8	|t|=0 37 significant at α > 0 8	|t|=0	|t|=0	|t|=0
IC2	4 375	5 22	3.27	4 63	3 0
	5	5 22	5 18	4 18	2.33
	|t|=0.676 significant at α > 0 8	|t|=0	|t|=2 73 significant at α >0 02	|t|=0 97 significant at α > 0 5	|t|=0 4 significant at α > 0 8
IC3	5 78	6.0	6 69	4 8	4.33
	5 78	6.0	6 23	4 8	4 0
	|t|=0	|t|=0	|t|=1 11 significant at α > 0 5	|t|=0	|t|=0 32 significant at α > 0.8
IC4	5 25	5.33	5 78	5 61	5.25
	6 25	5.11	6 0	5 54	5.75
	|t|=2 39 significant at α >0 1	|t|=0 25 significant at α > 0 8	|t|=0 47 significant at α > 0.8	|t|=0 29 significant at α > 0 8	|t|=0 56 significant at α > 0.8
IC5	4.11	6.11	4.63	5.75	4.5
	3 56	3 88	5 14	4.31	5.75
	|t|=1 41 significant at α > 0 2	|t|=3 46 significant at α > 0.01	|t|=1.4 significant at α > 0 2	|t|=6 11 significant at α > 0 001	|t|=1.81 significant at α > 0 2
IC6	6.11	4 55	6.5	4 125	5 25
	6.55	6.88	7 0	4 125	6 25
	|t|=1.25 significant at α > 0.5	|t|=4.11 significant at α > 0.01	|t|=3 61 significant at α > 0.01	|t|=0	|t|=2.83 significant at α > 0 05
IC7	4.77	4 88	4 21	4.23	3.75
	3 55	4 55	4.0	4 53	4.0
	|t|=2 81 significant at α > 0 02	|t|=0 36 significant at α > 0.8	|t|=0.39 significant at α > 0.8	|t|=1 2 significant at α > 0 5	|t|=0 52 significant at α > 0 8
IC8	5.0	4.22	4.57	5 66	4 75
	5 8	5 33	5 64	5 25	6 0
	|t|=1 58 significant at α > 0 2	|t|=1.46 significant at α > 0 2	|t|=3 18 significant at α > 0.01	|t|=1 52 significant at α > 0 2	|t|=1 98 significant at α > 0.2
IC9	5.44	5 66	4 5	4.06	3.75
	5 11	5 11	4.42	4 25	5.5
	|t|=0 62 significant at α > 0.8	|t|=1.09 significant at α > 0 5	|t|=0 20 significant at α > 0 8	|t|=0 89 significant at α > 0 5	|t|=3 13 significant at α > 0 05

IC10	6 11	5 22	5 2	3 6	4 5
	6 11	5 22	5 2	3 6	4 5
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0
IC11	4 0	4 8	5 0	5 38	3 5
	5 22	5 8	5 2	4 53	3 5
	|t|=3 05 significant at $\alpha > 0\ 01$	|t|=3 18 significant at $\alpha > 0\ 01$	|t|=0 43 significant at $\alpha > 0\ 8$	|t|=4 89 significant at $\alpha > 0\ 001$	|t|=0
IC12	6 55	5 66	5 64	3 35	6 0
	4 33	4 0	3 42	3 25	3 66
	|t|=4 19 significant at $\alpha > 0\ 01$	|t|=1 79 significant at $\alpha > 0\ 1$	|t|=4 93 significant at $\alpha > 0\ 001$	|t|=0 44 significant at $\alpha > 0\ 8$	|t|=2 65 significant at $\alpha > 0\ 2$
IC13	5 33	4 0	4 14	3 65	5 25
	5 55	3 66	4 14	3 69	5 25
	|t|=0 66 significant at $\alpha > 0\ 8$	|t|=0 71 significant at $\alpha > 0\ 5$	|t|=0	|t|=0 26 significant at $\alpha > 0\ 8$	|t|=0
IC14	4 2	3 8	3 4	5 2	5 5
	4 2	3 8	3 4	5.2	5 5
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0
IC15	3 33	3 44	4 35	4 03	3 5
	3 55	4.78	5 0	4.03	3 5
	|t|=0 47 significant at $\alpha > 0\ 8$	|t|=1 37 significant at $\alpha > 0.2$	|t|=0.94 significant at $\alpha > 0\ 5$	|t|=0	|t|=0
IC16	5 11	3 33	4.5	4 0	4 5
	6 22	5 11	5 64	4 0	5 0
	|t|=2.92 significant at $\alpha > 0.02$	|t|=2 63 significant at $\alpha > 0\ 05$	|t|=3 1 significant at $\alpha > 0\ 01$	|t|=0	|t|=0 65 significant at $\alpha > 0\ 8$
IC17	5.9	5 1	5.7	5 2	5 7
	5.9	5 1	5 7	5 2	5 7
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0
IC18	6 0	4 75	5 5	3 2	5.0
	6.0	4 75	5 5	3 2	5.0
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0
IC19	4 8	5.0	6 6	5 1	5 0
	4 8	5 0	6.6	5 1	5 0
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0
IC20	1.7	5 0	5 6	4 7	4 7
	1.7	5.0	5 6	4.7	4 7
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0

IC21	3 7	5 7	6 7	6 5	5 5
	3 7	5 7	6 7	6 5	5 5
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0
IC22	3 6	6 0	5 7	5 7	5 7
	3 6	6 0	5 7	5 7	5 7
	|t|=0	|t|=0	|t|=0	|t|=0	|t|=0

Comments on changes

Case 1 : Most difficult to change

Good support to hypotheses on manufacturing decisions. Due to the presence of Plant within a Plant (PWP) concept, the organization structure scores on specialization, standardization and formalization are high. Being a small organization, the score on centralization is also high because the owner may have desire for power and control.

Case 2 : Moderately difficult to change

Good support to hypotheses on manufacturing decisions except for vertical integration and vendor relations. Being a small firm, there was scarcity of fund and hence the firm may not be able to have a high score on vertical integration. Again, since the vendor relation is dependent on the vertical integration, which is low, the plant may go for a competitive relationship with vendor. For organization structure the changes are in tune with the theory.

Case 3 : Static case

Good support to hypotheses on manufacturing decisions as well as organization structure except complexity of workflow, which remains as an unexplained case.

Case 4 : Most difficult to change

Good support to hypotheses on manufacturing decisions. Due to the presence of PWP concept, the organization structure scores are likely to be high and hence they are in tune with the theory.

Case 5 : Most difficult to change

Except for plant & equipment, other manufacturing decisions are in tune with the theory. For organization structure, formalization is not in tune. This may be due to the fact that the plant was having a low level of use of standard procedures and hence, documentation in some cases may be necessary. So, the score on formalization may be moderate value.

Case 6 : Easy to change

Good support to hypotheses on plant & equipment, vertical integration and vendor relations Other manufacturing decisions give only moderate support. Due to the presence of PWP concept, the organization structure scores are likely to be high and hence they are in tune with the theory. Also, the company is ISO certified, leading to high formalization within the company, as documentation becomes very important.

Case 7 : Most difficult to change

Poor support for vertical integration and vendor relations. Being a sick firm it is not able to get enough funds from the government. So, in-house development of all parts is not possible and hence the vertical integration may be low. As the vendor relation is more dependent on the vertical integration rather than on manufacturing objectives, the low vertical integration may force the firm to have a competitive relationship with the vendor. Also, the changes in organization structure do not meet the changed objectives and hence they are not in tune with the theory.

Case 8 : Easy to change

Good support to hypotheses on manufacturing decisions as well as organization structure except complexity of workflow, which remains as an unexplained case.

Case 9 : Moderately difficult to change

Good support to hypotheses on manufacturing decisions and reasonably good support to organization structure scores as well except for the high complexity of workflow in the final objectives. Due to the high volume flexibility and delivery performance, the plant may need more interactions amongst the departments. As such, the complexity of workflow may be high.

Case 10 : Easy to change

Good support to hypotheses on manufacturing decisions except for labor skills but poor support for hypotheses on organization structure except for the centralization and complexity of workflow.

Case 11 : Easy to change

Good support to hypotheses on manufacturing decisions as well as organization structure.

Case 12 : Most difficult to change

Good support to hypotheses on manufacturing decisions except for plant & equipment in the final objectives. Organization structure scores are not in tune with the theory except for the centralization and complexity of workflow in the initial objectives. Because the firm could not adjust to the changes required in Plant & Equipment, the company has failed.

Case 13 : Easy to change

Good support to hypotheses on manufacturing decisions except vertical integration, which is high. This may be due to the fact that it is a small-scale industry. For the initial objectives, poor support to the hypotheses on organization structure except centralization and complexity of workflow. For the final objectives, good support to the hypotheses on organization structure except for specialization and formalization.

Case 14 : Static case

Good support to the hypotheses on manufacturing decisions. For organization structure the changes are in tune with the theory except specialization and centralization. Despite of the higher objectives, the owner of the plant has a high desire for power and position and hence most of the decisions are taken at higher level. So, the centralization may be high for this case.

Case 15 : Most difficult to change

Good support to hypotheses on manufacturing decisions for the initial objectives five to seven years' back. Due to the external competition, the company was forced to

change its objectives but couldn't adjust to these changes As a result, the company made a huge loss and became a sick industry. For the initial objectives, poor support to hypotheses on organization structure except specialization and standardization. For the final objectives, good support to the hypotheses on organization structure except for specialization and centralization.

Case 16 : Moderately difficult to change

Good support to hypotheses on manufacturing decisions. For the initial objectives, poor support to hypothesis on organization structure except standardization and complexity of workflow. For the final objectives, poor support to the hypotheses on organization structure. Since it is ISO certified company, the documentation may be high leading to high score on formalization.

Case 17 : Easy to change

Good support to hypotheses on manufacturing decisions but no support to hypotheses on organization structure. These deviations from the hypotheses for the organization structure scores could not be verified.

Case 18 : Easy to change

Good support to hypotheses on manufacturing decisions but no support to hypotheses on organization structure. These deviations from the hypotheses for the organization structure scores could not be verified.

Case 19 : Most difficult to change

Good support to hypotheses on manufacturing decisions for initial set of objectives but poor support to hypotheses for final set of objectives. For the initial objectives, poor support to hypotheses on organization structure except complexity of workflow. For the final objectives, good support to the hypotheses on organization structure except complexity of workflow. These deviations from the hypotheses for the organization structure scores could not be verified.

Case 20 : Easy to change

Good support to hypotheses on manufacturing decisions but poor support to hypotheses on organization structure. These deviations from the hypotheses for the organization structure scores could not be verified.

Case 21 : Static case

Good support to hypotheses on manufacturing decisions but poor support to hypotheses on organization structure. These deviations from the hypotheses for the organization structure scores could not be verified.

Case 22 : Static case

Good support to hypotheses on manufacturing decisions but poor support to hypotheses on organization structure. These deviations from the hypotheses for the organization structure scores could not be verified.

The percentage scores on dimensions of Organization Structure and percentage scores indicating closeness of these scores to predictions by the hypotheses have been evaluated for both the German and Indian Manufacturing firms. These scores have been presented in tables 10 and 11 and percentage alignment of the organization structure to the hypotheses has been inferred from them

Table No. 10

Percentage scores on dimensions of Organization Structure and Percentage Scores indicating closeness of these scores to predictions by the hypotheses for German Manufacturing firms

S.No.	Objective of Manufacturing Division	Percentage Specialization	Percentage Standardization	Percentage Formalization	Percentage Centralization	Percentage Complexity of Work-flow	%Score indicating closeness to scores as suggested by Hypotheses
GC1	Initially-Low Product variety	50	90 43	81 86	56 29	57 15	60
	Finally-Low product variety	51 86	92	85 71	55 43	57 15	60
GC2	Initially-Low product variety	76 86	63 43	90 43	70 43	100	80
	Finally-High product variety	76 86	66 71	90.43	70 43	100	80
GC3	Initially-High product variety	53 57	66 71	85 71	62 28	85.71	60
	Finally-High product variety	55 43	82 43	92 14	62 71	85.71	80
GC4	Initially-High product variety	51 86	60 29	55 86	67 14	71.43	40
	Finally-High product variety	59	84 14	67 57	67 14	71.43	20
GC5	Initially-Low product variety	73 45	67 86	70	81.29	57.14	80
	Finally-High product variety	73 45	67 86	71 43	81.29	57 14	20
GC6	Initially-Low product variety	55 43	66 71	89 57	71	57 14	80
	Finally-Low product variety	62 57	71 43	92 14	67.86	85.71	80
GC7	Initially-High product variety	82 14	81	92 14	67.86	64.29	20
	Finally-Low product variety	78 57	85 71	85 71	65.57	92 86	80
GC8	Initially-High Product variety	82.14	77 71	81 86	61.57	75	80
	Finally-High product variety	89.14	81	84 43	61.28	85 71	80
GC9	Initially-High product variety	71.43	84 14	81 43	66.29	57 14	20
	Finally-High product variety	71.43	84 14	81 43	66.29	57 14	20
GC10	Initially-High product variety	71 43	66 71	90 86	69.71	57.14	80
	Finally-High product variety	75	66 71	90 86	69 71	85 71	80
GC11	Initially-High product variety	73 86	77 71	91 43	63.43	60 71	80
	Finally-High product variety	85.71	79 29	90	63 43	82 13	80
GC12	Initially-High product variety	55.43	78 57	76 57	41.57	71 43	60
	Finally-High product variety	55.43	78 57	76 57	41.57	71.43	60
GC13	Initially-High product variety	55 43	87 86	89.57	58	75	80
	Finally-High product variety	71 43	87 86	92.14	53 14	85.71	60
GC14	Initially-High product variety	53 57	61.86	53 29	67	57.14	60
	Finally-High product variety	57.14	84	67.57	67	78.57	20

Table No. 11

Percentage scores on dimensions of Organization Structure and Percentage Scores indicating closeness of these scores to predictions by the hypotheses for Indian Manufacturing firms

S.No.	Objective of Manufacturing Division	Percentage Specialization	Percentage Standardization	Percentage Formalization	Percentage Centralization	Percentage Complexity of Work flow	% Score indicating closeness to scores as suggested by Hypotheses
IC1	Initially-Low Product variety	61 14	66 71	68.29	74 86	60 71	80
	Finally-High product variety	67 29	71 43	68 29	74 86	60 71	80
IC2	Initially-Low product variety	62 5	74 57	46 71	66 13	42 86	80
	Finally-Low product variety	71.43	74 57	74	59 71	33.29	100
IC3	Initially-Low product variety	82 57	85 71	95 57	68 57	61 86	80
	Finally-Low product variety	82 57	85 71	89	68.57	57.14	80
IC4	Initially-Low product variety	75	76 14	82 5	80 14	75	80
	Finally-High product variety	89 29	73	85 71	79 14	82.14	60
IC5	Initially-Low product variety	58 71	87.29	66 14	82 13	64 29	80
	Finally-High product variety	50 86	55 43	73 43	61 57	82 14	60
IC6	Initially-High Product variety	87 29	65	92 86	58 93	75	80
	Finally-High product variety	93 57	98 29	100	58 93	89 29	80
IC7	Initially-High product variety	68 14	69 71	60 14	60 43	53 57	0
	Finally-Low product variety	56.71	65	57 14	64 71	57 14	80
IC8	Initially-Low Product variety	71 43	60 29	65 29	80 86	67 86	80
	Finally-Low product variety	82 86	76 14	80 57	75	85 71	80
IC9	Initially-Low product variety	77 71	80 86	64 29	58	53.57	100
	Finally-Low product variety	73	73	63 14	60 71	78.57	80
IC10	Initially-High product variety	87 29	74.57	74 29	51 43	64.29	40
	Finally-High product variety	87 29	74.57	74 29	51.43	64 29	40
IC11	Initially-Low Product variety	57.14	68 57	71 43	76 86	50	100
	Finally-Low product variety	74 57	82 86	74 29	64.71	50	100
IC12	Initially-High product variety	93 57	80 86	80 57	47.86	85 71	40
	Finally-Low product variety	61 86	57 14	48 86	46.43	52 29	60
IC13	Initially-High product variety	76 14	57 14	59 14	52 14	75	40
	Finally-High product variety	79 29	52.29	59 14	52 71	75	60

IC14	Initially-High product variety	60	54 29	48 57	74 29	78 57	60
	Finally-High product variety	60	54 29	48 57	74 29	78 57	60
IC15	Initially-High product variety	47 57	49 14	62 14	57 57	50	40
	Finally-Low product variety	56 71	68 28	71 43	57 57	50	60
IC16	Initially-High product variety	73	47 57	64 29	57 14	64 28	40
	Finally-High product variety	88 86	73	80 57	57 14	71 43	40
IC17	Initially-High product variety	84 29	72 86	81 43	74 29	81 43	20
	Finally-High product variety	84 29	72 86	81 43	74 29	81 43	20
IC18	Initially-High product variety	85 71	67 86	78 57	45 71	71 43	40
	Finally-High product variety	85 71	67 86	78 57	45 71	71 43	40
IC19	Initially-High product variety	68 57	71.43	94 29	72 86	71 43	20
	Finally-Low product variety	68 57	71 43	94 29	72 86	71.43	20
IC20	Initially-High product variety	24 29	71.43	80	67 14	67.14	40
	Finally-High product variety	24 29	71 43	80	67 14	67.14	40
IC21	Initially-High product variety	52 86	81 43	95 71	92 86	78 57	40
	Finally-High product variety	52 86	81 43	95 71	92 86	78 57	40
IC22	Initially-High product variety	51 43	85 71	81 43	81 43	81 43	40
	Finally-High product variety	51 43	85 71	81 43	81 43	81 43	40

It can be inferred from table 10 that five German firms out of total fourteen firms have reasonably poor Organization Structure alignment to prediction by theory (as given by Miles and Snow, 1978). Similarly, from table 11 it can be inferred that twelve Indian firms out of total twenty-two firms have a reasonably poor Organization Structure alignment to prediction by theory.

The forthcoming tables show the alignment on various manufacturing decisions and organization structure to the hypotheses for both the German and Indian Manufacturing firms The tables have been categorized according to the cases of Most Difficult changes, cases with Moderate Difficulty, cases with Easy changes and Static cases.

The notations used are as follows:

- GA - Good Alignment
- PA - Poor Alignment
- DNA - Data Not Available

Cases of Most Difficult changes

Table No. 12(a)

Alignment on various Manufacturing Decisions of German Manufacturing Firms

	GC2	GC5	GC7
Plant & Equipment	GA	DNA	GA
PPC	GA	GA	GA
Labor Skills	GA	GA	GA
Vertical Integration	PA	DNA	-
Vendor Relation	GA	DNA	GA
Organization Structure	GA – 80%	PA – 50%	PA – 50%

Table No.12 (b)

Alignment on various Manufacturing Decisions of Indian Manufacturing Firms

	IC1	IC4	IC5	IC7	IC12	IC15	IC19
Plant & Equipment	GA	GA	GA	GA	PA	PA	PA
PPC	GA	GA	GA	GA	GA	PA	GA
Labor Skills	GA	GA	GA	GA	GA	PA	PA
Vertical Integration	GA	GA	GA	PA	GA	PA	PA
Vendor Relation	GA	GA	GA	PA	GA	PA	PA
Organization Structure	GA-80%	GA-80%	GA-70%	PA-40%	PA-50%	PA-50%	PA-50%

Cases of changes with Moderate Difficulty

There are no moderately difficult cases from the data collected for the German Manufacturing Firms

Table No.13

Alignment on various Manufacturing Decisions of Indian Manufacturing Firms

	IC2	IC9	IC16
Plant & Equipment	GA	GA	GA
PPC	GA	GA	GA
Labor Skills	GA	GA	GA
Vertical Integration	PA	GA	GA
Vendor Relation	PA	GA	GA
Organization Structure	GA – 90%	GA – 90%	PA –30%

Cases of easy changes

Table No. 14(a)

Alignment on various Manufacturing Decisions of German Manufacturing Firms

	GC1	GC4	GC8
Plant & Equipment	GA	GA	GA
PPC	GA	GA	GA
Labor Skills	GA	GA	GA
Vertical Integration	GA	GA	GA
Vendor Relation	GA	GA	GA
Organization Structure	GA – 60%	PA – 30%	GA – 80%

Table No. 14(b)

Alignment on various Manufacturing Decisions of Indian Manufacturing Firms

	IC6	IC8	IC10	IC11	IC13	IC17	IC18	IC20
Plant & Equipment	GA	GA	GA	GA	GA	GA	GA	GA
PPC	GA	GA	GA	GA	GA	GA	GA	GA
Labor Skills	GA	GA	PA	GA	GA	GA	GA	GA
Vertical Integration	GA	GA	GA	GA	PA	GA	GA	GA
Vendor Relation	GA	GA	GA	GA	GA	GA	GA	GA
Organization Structure	GA 80%	GA 80%	PA 40%	GA 100%	PA 50%	PA 20%	PA 40%	PA 40%

Static cases

Table No. 15(a)

Alignment on various Manufacturing Decisions of German Manufacturing Firms

	GC3	GC6	GC9	GC10	GC11	GC12	GC13	GC14
Plant & Equipment	GA	GA	GA	GA	NA	NA	GA	GA
PPC	GA	GA	GA	GA	GA	GA	GA	GA
Labor Skills	GA	GA	GA	GA	GA	GA	GA	GA
Vertical Integration	GA	GA	GA	GA	NA	NA	GA	GA
Vendor Relation	GA	GA	GA	GA	GA	GA	GA	GA
Organization Structure	GA 70%	GA 80%	PA 20%	GA 80%	GA 80%	GA 60%	GA 70%	PA 40%

Table No. 15(b)

Alignment on various Manufacturing Decisions of Indian Manufacturing Firms

	IC3	IC14	IC21	IC22
Plant & Equipment	GA	GA	GA	GA
PPC	GA	GA	GA	GA
Labor Skills	GA	GA	GA	GA
Vertical Integration	GA	GA	GA	GA
Vendor Relation	GA	GA	GA	GA
Organization Structure	GA 80%	GA 60%	PA 40%	PA 40%

It thus appears from the data that there are approximately 50% of the German manufacturing firms that have poor alignment of actual organization structure dimension scores to the scores as predicted by theory (Miles and Snow et-al (1978)). Similarly, this is true for Indian manufacturing firms sampled in India by Behera (2000) and Reddy (1999). In the category of "Most Difficult Changes", German Manufacturing firms had good alignment as far as other manufacturing decisions are concerned (except for organization structure dimensions); whereas, approximately 50% of Indian manufacturing firms had poor alignment on decisions of plant and equipment, vendor relations and vertical integration

Listed below are some of the factors that affect the organization structure dimensions and the manufacturing decisions of an enterprise. These factors have led to revision and modification of the hypotheses for some cases.

❖ If the company has many plants within a plant (PWP) than the scores on organization structure dimensions – specialization, standardization, formalization and centralization are likely to be high
❖ If the company is ISO certified than, there is high formalization within the company, as documentation becomes very important.
❖ If the organization is a small enterprise than the centralization score is likely to be high as the owner may have a desire for power and control.
❖ Due to high tech nature of the business, the firm may have high vertical integration.

Table No. 16

Corporate Strategy Making Process for German Manufacturing firms

(Scale 0 – 4)

S. No.	Rational	Interaction	Assertiveness
GC1	1.15	1	3 *
GC2	2.77	3.5 *	3 2 *
GC3	3.92 *	3	3.8 *
GC4	2.31 *	2	2.4 *
GC5	1	3 *	1 2
GC6	2 15 *	2	2.4 *
GC7	1.77	3 *	2
GC8	3.23 *	2 75 *	2.1
GC9	2	2 5	3 2 *
GC10	2	3 *	1.6
GC11	1.92	3 *	3 4 *
GC12	1.77	4 *	3 2 *
GC13	3.35 *	3 5 *	3 6 *
GC14	2 23 *	2 5 *	1.8

The stars indicate the dominant Corporate Strategy Making Process.

Table No. 17

Manufacturing Strategy Making Process for German Manufacturing firms

(Scale 0 – 4)

S. No.	Rational	Interaction	Assertiveness
GC1	1 68	1 25	2 5 *
GC2	3 *	2 5	3.2 *
GC3	3.27	3 5 *	3 6 *
GC4	2 45 *	2	2 2
GC5	1 64	3.5 *	2
GC6	2 45 *	2	2 4 *
GC7	2	3 *	2
GC8	2 73 *	3 *	2 2
GC9	1.91	2 5	2.8 *
GC10	1.91	3 *	1 6
GC11	2.1	3 *	3 *
GC12	1 73	4 *	3 2 *
GC13	3.27 *	3.5 *	3 6 *
GC14	2 18 *	1.5	2

The stars indicate the dominant Manufacturing Strategy Making Process.

Table No.18

Dominant Corporate and Manufacturing Strategy Making Processes pursued by German firms

S.No.	Dominant Corporate Strategy Making Process	Dominant Manufacturing Strategy Making Process
GC1	Assertiveness	Assertiveness
GC2	Interaction and Assertiveness	Rational and Assertiveness
GC3	Rational and Assertiveness	Interaction and Assertiveness
GC4	Rational and Assertiveness	Rational
GC5	Interaction	Interaction
GC6	Interaction and Assertiveness	Interaction and Assertiveness
GC7	Interaction	Interaction
GC8	Rational and Interaction	Rational and Interaction
GC9	Assertiveness	Assertiveness
GC10	Interaction	Interaction
GC11	Interaction and Assertiveness	Interaction and Assertiveness
GC12	Interaction and Assertiveness	Interaction and Assertiveness
GC13	Rational, Interaction and Assertiveness	Rational, Interaction and Assertiveness
GC14	Rational and Interaction	Rational

There is good alignment between Corporate & Manufacturing Strategy making processes for German manufacturing firms.

Table No.19

Corporate and Manufacturing Strategy Making Processes pursued by German firms

Strategy Making Processes	No. of firms for Corporate Strategy	No. of firms for Manufacturing Strategy
• **Rational**	0	2
• **Interaction**	3	3
• **Assertiveness**	2	2
• **Rational & Interaction**	2	1
• **Rational & Assertiveness**	3	2
• **Interaction & Assertiveness**	3	3
• **Rational, Interaction & Assertiveness**	1	1

Table No. 20

Manufacturing Strategy Making Process for Indian Manufacturing firms

(scale of 1-7)

S. No.	Rational	Interaction	Assertiveness
ICP1	3.5	4.0	5.6 *
ICP2	2.9	4.0	5.6 *
ICP3	3.5	3.5	4.5 *
ICP4	4.0	3.0	5.4 *
ICP5	4 6	4.0	5.4 *
ICP6	4.1	3.2	5.5 *
ICP7	5.1 *	3.0	5.6 *
ICP8	5.5 *	4.5	4.6
ICP9	5.5 *	5.0 *	4.0
ICP10	5.4 *	3.5	4.8 *
ICP11	4.1 *	3.5	3.6
ICP12	5.6 *	2.5	4.4
ICP13	3.9	5.5 *	4.8 *
ICP14	4.1	5.5 *	4.2
ICP15	3.0	7.0 *	6.0 *
ICP16	4.9 *	5.5 *	3.3
ICP17	2.6 *	3.0 *	2.6 *
ICP18	4.3 *	4.0 *	4.4 *
ICP19	4.8 *	2.5	5.0 *
ICP20	4.15 *	3.5	4.0 *

Table No. 21

Corporate Strategy Making Process for Indian Manufacturing firms

(scale of 1-7)

S. No.	Rational	Interaction	Assertiveness
ICP1	4.5	4.5	5.4 *
ICP2	4 5	4.5	5.8 *
ICP3	3.6	3.5	4.4 *
ICP4	2.9	3.5	6.2 *
ICP5	3.9 *	3	3.6 *
ICP6	4.2	3	5.8 *
ICP7	5.8 *	4	6.2 *
ICP8	5.6 *	5.5 *	3.6
ICP9	6.4 *	5	3.8
ICP10	5.5 *	4	5 *
ICP11	4.5 *	4 *	4 *
ICP12	5.5 *	3	5 *
ICP13	4	6 *	4
ICP14	4.15	6 *	4.2
ICP15	2.6	6 *	5.6 *
ICP16	4.2	4	5.4 *
ICP17	2.5 *	2.5 *	2
ICP18	5 *	4	4.4
ICP19	4 5	2.5	5.8 *
ICP20	4.1 *	4.5 *	4 *

Table No.22

Dominant Corporate and Manufacturing Strategy Making Processes pursued by Indian firms

S.No.	Dominant Corporate Strategy Making Process	Dominant Manufacturing Strategy Making Process
ICP1	Assertiveness	Assertiveness
ICP2	Assertiveness	Assertiveness
ICP3	Assertiveness	Assertiveness
ICP4	Assertiveness	Assertiveness
ICP5	Rational and Assertiveness	Assertiveness
ICP6	Assertiveness	Assertiveness
ICP7	Rational and Assertiveness	Rational and Assertiveness
ICP8	Rational and Interaction	Rational
ICP9	Rational	Rational and Interaction
ICP10	Rational and Assertiveness	Rational and Assertiveness
ICP11	Rational, Interaction and Assertiveness	Rational
ICP12	Rational and Assertiveness	Rational
ICP13	Interaction	Interaction and Assertiveness
ICP14	Interaction	Interaction
ICP15	Interaction and Assertiveness	Interaction and Assertiveness
ICP16	Assertiveness	Rational and Interaction
ICP17	Rational and Interaction	Rational, Interaction and Assertiveness
ICP18	Rational	Rational, Interaction and Assertiveness
ICP19	Assertiveness	Rational and Assertiveness
ICP20	Rational, Interaction and Assertiveness	Rational and Assertiveness

Except for a few glaring cases of misalignment of Corporate and Manufacturing Strategy making processes (as evident in cases like ICP16, ICP18), we have reasonable alignment between Corporate and Manufacturing processes for Indian firms.

Table No.23

Corporate and Manufacturing Strategy Making Processes pursued by Indian firms

Strategy Making Processes	No. of firms for Corporate Strategy	No. of firms for Manufacturing Strategy
• Rational	2	2
• Interaction	2	2
• Assertiveness	7	6
• Rational & Interaction	2	2
• Rational & Assertiveness	4	4
• Interaction & Assertiveness	1	2
• Rational, Interaction & Assertiveness	2	2

It can be seen from the above tables that the firms use pure strategy making processes (such as rational, interaction and assertiveness) as well as mixed strategy making processes (such as rational and interaction; rational and assertiveness, etc.). But it can be inferred that both Indian firms (ICP1 – ICP20) and German firms (GC1 – GC14) do not give equal emphasis to all the three strategy making process as suggested by the theory. This is evident by looking at the tables and evaluating the number of combinations for the three different strategy-making processes.

Tables 22 and 24 relate the manufacturing strategy making process to the dimensions of the organization structure for both the German and Indian firms. The results have been prepared using a regression model. For the German firms it can be easily inferred that rational process of strategy making is positively associated with formalization (high score), negatively associated with centralization (low score) and positively associated with complexity of workflow (high score). Hence, these scores are in tune with the theory. The interaction process of strategy making is positively associated with formalization but the score is not too high and hence the hypothesis is not completely verified. The centralization score is low for the interaction process of strategy making, thus supporting the hypothesis. Similarly, for assertiveness formalization should be low, centralization should be high and complexity of workflow should be low. But, looking at the scores we find that the formalization

score is high and centralization score is low. Hence, these scores are not in tune with the theory. Here, formalization may be high due to the fact that most of the companies today are ISO certified and hence documentation becomes very important The complexity of workflow score is in tune with the hypothesis

For the Indian firms, rational process of strategy making has high score for formalization, moderate score for centralization and low score for complexity of workflow. The high score on formalization associated with rationality is in tune with the hypothesis but the scores on centralization and complexity of workflow are not in tune with the hypotheses. Interaction process of strategy making has high score on formalization and low score on centralization, which are in tune with the hypotheses Also, low score on formalization, moderate score on centralization and low score on complexity of workflow associated with assertiveness are in tune with the hypotheses.

Table No.24

Correlation between Manufacturing Strategy Making Process and Dimensions of Organization Structure for German Manufacturing firms

Manufacturing Strategy Making Process	Formalization	Centralization	Complexity of workflow
• Rational	0.435	-0.066	0.637
• Interaction	0.211	-0.22	0.179
• Assertiveness	0.415	-0.522	0.157

Table No.25

"t" values and "p" values between Manufacturing Strategy Making Process and Dimensions of Organization Structure

Manufacturing Strategy Making Process	Formalization	Centralization	Complexity of workflow
• Rational	t = 1.275 p<0.2264	t = 2.8265 p<0.0153	t = 1.0006* p<0.2264
• Interaction	t = 0.8219 p<0.4271	t = 2.975 p<0.0116	t = 1.8496 p<0.0 891
• Assertiveness	t = 0.4471 p<0.6628	t = 5.1089 p<0.0003	t = 2.4091 p<0.0330

Table No.26

Correlation between Manufacturing Strategy Making Process and Dimensions of Organization Structure for Indian Manufacturing firms

Manufacturing Strategy Making Process	Formalization	Centralization	Complexity of workflow
• Rational	0.937	0 432	0.17
• Interaction	0.842	0.078	-
• Assertiveness	-0.236	0 327	-0.844

Table No.27

Relating Objectives of Manufacturing Division with actual dominant Manufacturing Strategy Making Process for German Manufacturing firms

S.No.	Final Objectives of Manufacturing Division	Dominant Manufacturing Strategy Making Process
GC1	Prod. Variety-low	Assertiveness
GC2	Prod. Variety-High	Rational and Assertiveness
GC3	Prod. Variety-High	Interaction and Assertiveness
GC4	Prod. Variety-High	Rational
GC5	Prod. Variety-High	Interaction
GC6	Prod. Variety-low	Rational and Assertiveness
GC7	Prod. Variety-low	Interaction
GC8	Prod. Variety-High	Rational and Interaction
GC9	Prod. Variety-High	Assertiveness
GC10	Prod. Variety-High	Interaction
GC11	Prod. Variety-High	Interaction and Assertiveness
GC12	Prod. Variety-High	Interaction and Assertiveness
GC13	Prod. Variety-High	Rational, Interaction and Assertiveness
GC14	Prod. Variety-High	Rational

Table No.28

Relating Objectives of Manufacturing Division with actual dominant Manufacturing Strategy Making Process for Indian Manufacturing firms

S.No.	Final Objectives of Manufacturing Division	Dominant Manufacturing Strategy Making Process
ICP1	Product variety - High	Assertiveness
ICP2	Product variety - High	Assertiveness
ICP3	Product variety - High	Assertiveness
ICP4	Product variety - High	Assertiveness
ICP5	Product variety - Low	Assertiveness
ICP6	Product variety - High	Assertiveness
ICP7	Product variety - High	Rational and Assertiveness
ICP8	Product variety - High	Rational
ICP9	Product variety - Low	Rational and Interaction
ICP10	Product variety - High	Rational and Assertiveness
ICP11	Product variety - High	Rational
ICP12	Product variety - High	Rational
ICP13	Product variety - Low	Interaction and Assertiveness
ICP14	Product variety - Low	Interaction
ICP15	Product variety - High	Interaction and Assertiveness
ICP16	Product variety - High	Rational and Interaction
ICP17	Product variety - High	Rational, Interaction and Assertiveness
ICP18	Product variety - High	Rational, Interaction and Assertiveness
ICP19	Product variety - High	Rational and Assertiveness
ICP20	Product variety - High	Rational

Table No.29

Number of German firms pursuing different Manufacturing Strategy Making Process with respect to High / Low Product variety

Objective of Manufacturing Division	Manufacturing Strategy Making Process
High Product Variety	Assertiveness – 6
	Interaction – 7
	Rational – 5
Low Product Variety	Assertiveness – 2
	Interaction – 1
	Rational – 1

Table No.30

Number of Indian firms pursuing different Manufacturing Strategy Making Process with respect to High / Low Product variety

Objective of Manufacturing Division	Manufacturing Strategy Making Process
High Product Variety	Assertiveness – 12
	Interaction – 4
	Rational – 10
Low Product Variety	Assertiveness – 2
	Interaction – 3
	Rational – 1

It turns out that German Manufacturing firms give greater emphasis for "Interaction" than the Indian firms who have low score on "Interaction". Indian Manufacturing firms have high score on "Assertiveness". Both Indian and German Manufacturing firms do not give equal emphasis to all the three strategy making process.

CHAPTER – 5

CONCLUSIONS

In this work we have corrected the framework relating manufacturing objectives to manufacturing decisions as suggested by Reddy (1999) and Behera (2000) by using the framework given by Miles and Snow (1978) As per the revised framework, it turns out that substantial number of German and Indian manufacturing firms had poorly designed organization structures when compared to predictions by theory We also offered certain modifying considerations, which led to different manufacturing decisions when compared to predictions of theory proposed by Miles and Snow (1978).

We thus found strong relation between objectives and manufacturing decisions From the theory suggested by Miller (1987), it turns out that both *'Defenders'* and *'Prospectors'* should have all three processes of strategy making process, i.e, Rationality, Interactiveness and Assertiveness. However, both German and Indian manufacturing firms did not have all three processes as dominant It was found that about 50% of German Manufacturing firms used 'Interaction' as the dominant Manufacturing Strategy Making Process, whereas 50% of Indian Manufacturing firms used 'Assertiveness' as the dominant Manufacturing Strategy Making Process. This was an interesting observation.

Also, no firm relation was found between objectives, contents and processes used by both German and Indian Manufacturing firms. Hence, we could not find any support to relationship between process and contents as suggested by Sharma & Upadhyay (1998)

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APPENDIX

QUESTIONNAIRE SET NO. 1

RELATING PROCESS, OBJECTIVES AND CONTENTS OF MANUFACTURING STRATEGY

I. GENERAL

1. Name of the Company _____
2. Primary Product of the Company _____
3. Please specify your Name and Designation _____
4. Number of employees working in the Company _____
5. How old is the Company _____

II. CURRENT AND PAST OBJECTIVES OF MANUFACTURING DIVISION

****_Five to seven years back,_** what was your:

1. Product Variety High_____ Low_____
2. Volume Flexibility High_____ Low_____
3. Quality High_____ Low_____
4. Delivery Performance High_____ Low_____
5. Inclination towards *Sustainable Development* High_____ Low_____

****_Presently_**, what is your:

1. Product Variety High_____ Low_____
2. Volume Flexibility High_____ Low_____
3. Quality High_____ Low_____
4. Delivery Performance High_____ Low_____
5. Inclination towards *Sustainable Development* High_____ Low_____

**What is the proportion of general to special purpose machines in your Organization:

Five years back_____ Presently_____

**Do you maintain high or low inventories at various stages of production?

High_____ Low_____

Instructions:

On a scale of **0-4**

0 = Low (Not an issue for your manufacturing)

1 = Somewhat higher (lower than most others in your industry)

2 = Moderate (Comparable to most others in the industry)

3 = High (Comparable to best in the industry)

4 = Very High (Leader in the market)

Five to seven years back, your requirements (as dictated by market):

1. To offer consistent Quality _____
2. To respond to swing in volume _____
3. To introduce new products quickly / rapid design changes _____
4. To deliver on time _____

Presently, your requirements (as dictated by the market)

1. To offer consistent Quality _____
2. To respond to swing in volume _____
3 To introduce new products quickly / rapid design changes _____
4 To deliver on time _____

III. CURRENT AND PAST STATUS OF MANUFACTURING DECISIONS

(*THE LEFT BOX IS FOR STATUS *5 TO 7 YRS BACK [P]* AND RIGHT FOR *CURRENT [C]*)

➢ ***PRODUCTION PLANNING AND CONTROL:***

1. To match productive capacity to variable demand over medium term planning horizon (12-18 months) you rely on-

	[P]	[C]
(a) Scheduling	☐	☐
(b) Build up or run down finished goods inventory	☐	☐
(c) Increase or decrease working shifts/workers/time/any other.	☐	☐

2. Does your firm pursue any particular scheme for inventory management?

(a) MRP	☐	☐
(b) JIT	☐	☐
(c) Classical : production and inventory system	☐	☐
(d) Any other	☐	☐

➢ ***VERTICAL INTEGRATION AND VENDOR RELATIONS:*** **[P]** **[C]**

1. For your major products, please mention the percentage of value added within the company to the final product value. ☐ ☐
2. For your major products the cost of assemblies purchased as a percentage of goods sold. ☐ ☐
3. How many vendors for a particular assembly/product are there on an average- ☐ ☐
4. Your firm will consider vendor relation strategy followed by it as –

(a) Vendor is not important, so no intended policies as such.	☐	☐
(b) Co-operative (i.e. important to join vendor programs)	☐	☐
(c) Competitive (i.e. vendor is selected based on cost, delivery requirements resulting in frequent changes in vendors.)	☐	☐

➢ ***HUMAN RESOURCES:***

1. Majority of workers in your Organization were/are-:

	[P]	[C]
(a) Unskilled	☐	☐
(b) Semiskilled	☐	☐
(c) Moderate	☐	☐
(d) Multi-skilled	☐	☐

2. The amount of formal training provided by your firm to an employee apart from regular wo throughout his tenure was / is –

	[P]	[C]
(a) Low	☐	☐
(b) Moderate	☐	☐
(c) High	☐	☐
(d) Very High	☐	☐
3. Salaries as the percentage of cost of sales	☐	☐

IV. CURRENT AND PAST STATUS OF ORGANIZATION STRUCTURE

➢ *STANDARDISATION:*

Instruction: For the following questions write a number between **0 to 6** representing appropriate leve in your Organization.

	[P]	[C]
1. What is the frequency of the inspection procedure carried out? *(0-None; 2-Haphazard; 4-Random sample; 6-100%)*	☐	☐
2. What is the range of the inspection procedure carried out? *(0-None; 2-Some; 4-All New; 6-All)*	☐	☐
3. What is the methodology of the inspection procedure used? *(0-None; 2-Visual; 4-Attributes; 6-Measurements)*	☐	☐
4. What type of the inspection procedure is followed.? *(0-None; 2-One of the process, Raw material or Final inspection; 4-Process+Final Inspection; 6-Process +Raw material + Final inspection)*	☐	☐
5. How frequently is the stock-taking carried out? *(0-Never taken; 1-Yearly; 2-Semiannually; 3-Quarterly; 4-Monthly; 5-Weekly; 6-Daily)*	☐	☐
6. How often firm plans are made? *(0-Daily; 1-Weekly; 2-Monthly; 3-Quarterly; 4-Yearly; 5-Over one year; 6-Permanent)*	☐	☐
7. How often is scheduling carried out? *(0-As needed; 1-Monthly; 2-Weekly; 4-Daily; 6-Continuous)*	☐	☐
8. How is the progress checking done? *(0-None; 3-Irregular; 6-Regular)*	☐	☐
9. What is the maintenance procedure? *(0-No procedure; 2-Breakdown Maintenance; 4-Mixed; 5-Planned Maintenance; 6-Programmed replacements)*	☐	☐

➢ *SPECIALIZATION:*

Instruction: For the following questions write a number between **0 to 6** representing appropriate Level in your Organization.

Scale: *0 = (either) low / rarely / never; 6 = (either) Very high / Extensively / Mostly / Always.*

	[P]	[C]
1. Approximate number of storekeepers specialized by Product, Material or the Process?	☐	☐
2. Approximate number of suppliers specialized by the Product or Material?	☐	☐
3. Approximate number of stock controllers specialized by the Product, Process or the Material?	☐	☐
4. To what extent is costing specialized by product or factory?	☐	☐
5. To what extent is the Machine maintenance specialized by the process?	☐	☐
6. To what extent is the electrical maintenance specialized by the process?	☐	☐
7. Is scheduling specialized by the process?	☐	☐
8. Is the product inspection specialized by stages?	☐	☐
9. Is the work-study specialized by stages?	☐	☐

➢ *CENTRALIZATION:*

Instruction: For the following questions please respond by filling an appropriate number indicating a particular level as indicated.

Scale: *0 = Operating (e.g. Direct worker); 1 = Supervisory (e.g. Foreman); 2 = Work Flow Unit (e.g. Plant Manager); 3 = All workflow activities (e.g. Production Manager); 4 = Whole Organization (e.g. Managing Director); 5 = Above Chief Executive (e.g. Board of group)*

Levels at which the following decisions are taken-	[P]	[C]
1. Labor force requirements.	☐	☐
2. Appointment of Direct workers.	☐	☐
3. Promotion of Direct workers.	☐	☐
4. Number of Supervisors.	☐	☐
5. Promotion of Supervisory staff.	☐	☐
6. Salaries of Supervisory staff.	☐	☐
7. Spending of the unbudgeted or unallocated money on the capital items.	☐	☐
8. Spending of the unbudgeted or unallocated money on the revenue items.	☐	☐
9. Selection of the type or brand of new equipment.	☐	☐
10. Overtime to be worked.	☐	☐

	[P]	[C]
11. Delivery dates or the priority of the orders	☐	☐
12. New product or service.	☐	☐
13. Marketing territories to be covered.	☐	☐
14. Extent or class of Market (Operational field) to be aimed for.	☐	☐
15. Costing system applied.	☐	☐
16. Inspection system to be implemented.	☐	☐
17. Plans to be worked on.	☐	☐
18. Dismissal of the Operative level staff.	☐	☐
19. Dismissal of the supervisory staff.	☐	☐
20. Methods of Personnel Selection.	☐	☐
21. Training Methods.	☐	☐
22. Buying Procedure.	☐	☐
23. Suppliers of material to be used.	☐	☐
24. Method of work to be used, i.e. how a job is to be done.	☐	☐
25. Machinery or Equipment to be used for the job.	☐	☐
26. Allocation of work amongst the available workers.	☐	☐
27. Welfare facilities to be provided.	☐	☐
28. Price of the output.	☐	☐
29. Altering the responsibilities or the areas of work of functional specialists Departments.	☐	☐
30. Altering the responsibilities or the areas of work of line departments.	☐	☐
31. Creation of a new job.	☐	☐
32. Who takes over in the absence of the Chief Executive.	☐	☐

➢ ***FORMALIZATION:***

Instruction: For the following questions write a number in the range of **0 to 6**, indicating the level which documentation of the procedure is employed in your Organization.

Scale: *0 = Rarely (used or available); 6 = To a large extent.*

	[P]	[C]
1. To what extent are written instructions available to direct workers?	☐	☐
2. To what extent are written terms of reference or job descriptions available?	☐	☐
3. To what extent are written policies used?	☐	☐
4. To what extent are workflow schedule or programs maintained?	☐	☐

[P] [C]

5. To what extent is management approval in written required for certain decisions? ☐ ☐
6. To what extent are memo forms used? ☐ ☐
7. Do you have a minute for Senior Executive meeting? ☐ ☐
8. Do you have an agenda for workflow (production)? ☐ ☐
9. Do you maintain welfare documents for the direct workers on engagements? ☐ ☐
10. Does your Organization maintain dismissal forms or reports recording or communicating th dismissal? ☐ ☐
11. Does your Organization maintain records of inspection performed, like Quality cards? ☐ ☐
12. Does your Organization maintain record of maintenance performed on workflow (production equipment? ☐ ☐
13. Does your Organization maintain record of direct worker's work and time? ☐ ☐

➢ *COMPLEXITY OF WORKFLOW:*

Instruction: For the following questions write a number between **0 to 6**, indicating the extent to whic your Organization employs each statement.

Scale: 0 = Used rarely; 6 = Used very frequently [P] [C]

1. How frequently are interdepartmental committees set up to engage in joint decision Making? ☐ ☐
2. How frequently are task forces, temporary bodies set up to facilitate interdepartment collaboration on a specific project? ☐ ☐
3. Is there use of liaison personnel whose specific job is to co-ordinate the efforts of sever departments for purpose of a specific project? ☐ ☐
4. What is the interdepartmental interaction on most decisions? ☐ ☐

QUESTIONNAIRE SET NO. 2

CORPORATE STRATEGY MAKING PROCESS

Instruction: **Given below are some statements indicating how the managers go about to make strategies. Your task is to indicate the extent to which you generally employ the strategies given in each statement by writing an appropriate number as directed.**

A. Instruments for Planning and Control:

Scale: 0 = used rarely; 4 = used frequently, with **intermediate numbers representing appropriate level of use.**

1. Do you apply Operations Research technique such as Linear Programming and Simulation to make major Production, Marketing and Financial decisions.

---

2. Do you resort to methods of collective inquiry (such as Brainstorming, Delphi, etc.) by the senior management groups for novel solutions to problems.

---

3. Do you have formalized systematic search for evaluation of opportunities or acquisitions, new investments, new markets, etc. ----------

4. Do you make use of Staff Specialists (In-house Experts) to investigate and write report on major decisions. ----------

B. Instruments for Management Approach:

Scale: *The figures within the square braces indicate the* **level of use.**

5. Do the Choices among strategic alternatives tend very often to be made quickly and without precision, as time pressures are often substantial *[0];* or much thought and analysis enter into key management decisions *[4].* ----------

6. Is the Management time consumed by decisions aimed at its resolution *[0];* or it is consumed by decisions aimed at exploring opportunities in the environment *[4].*

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7. Does the management adopt Short-term orientation *[0];* or Medium term

orientation *[2];* or long term (over 5 years) orientation *[4].* ----------

8. Is the planning for the Long Term Investments, Forecasting of Sales, Nature of markets, Technology, etc., done by the top management very rarely or haphazardly *[0];* or it is done very frequently and intensively *[4].* ----------

C. Instruments for Information Gathering:

***Scale**: 0 = Not ever used; 4 = Used extremely frequently,* **with intermediate numbers representing appropriate level of use.**

9. Routine gathering of opinions from Clients. ----------

10. Explicit tracking of policies and tactics of Competitors. ----------

11. Forecasting Sales, Customer Preferences, Technology, etc. ----------

12. Special Market Research Studies. ----------

D. Instruments for Strategic Decision-making:

***Scale:** The figures within the square braces indicate the* **level of use.**

13. There is no explicit conceptualization of administrative and product market strategies *[0];* or the strategies are well and precisely conceptualized that guide the modus operandi and decisions *[4].* ----------

14. Do you employ consensus oriented team decision making for strategic decisions *[0];* or decisions are made individually without much interaction *[4].* ----------

E. Instrument for Bargaining & Discussion:

***Scale:** 0 = Not very important; 2 = Moderately important; 4 = Extremely important.*

15. How important is bargaining and discussion for the Middle and Top management in the resolution of problems, conflicts or decisions? ----------

F. Instruments for Pro-activeness :

***Scale:** The figures within the square braces indicate the* **level of use.**

16. Do you have a strong tendency to follow competitors in introducing novel and innovative products *[0];* or do you always try to be ahead of competitors in product novelty or speed of innovation and usually succeed *[4].* ----------

17. Do you favor tried and true methods as compared to other competitors in the market *[0];* or are you growth, innovation and development oriented *[4].* ----------

18. Do you try to Co-operate and Co-exist with competitors *[0];* or do you pursue

a tough "undo the competitors" philosophy *[4]*. ----------

G. Instruments for Risks' Evaluation:

Scale: The figures within the square braces indicate the **level of use.**

19. Do you have a strong proclivity towards low risk projects (with normal and certain rates of return) *[0];* or does your firm have a strong Proclivity for high-risk projects (with chances of high returns) *[4]*. ----------

20. Do you feel that it is best to explore the environment gradually via timid, incremental behavior *[0];* or it is best to explore the environment in a bold manner, wide ranging acts are viewed as useful and a common practice *[4]*. ----------

QUESTIONNAIRE SET NO. 3

MANUFACTURING STRATEGY MAKING PROCESS

Instruction: Given below are some statements indicating how the managers go about to make strategies. Your task is to indicate the extent to which you generally employ the strategies given in each statement by writing an appropriate number as directed.

A. Instruments for Planning and Control:

Scale: 0 = used rarely; 4 = used frequently, with **intermediate numbers representing appropriate level of use.**

1. Do you apply Operations Research technique such as Linear Programming and Simulation to make major Production decisions. ----------

2. Do you resort to methods of collective inquiry (such as Brainstorming, Delphi, etc.) by the senior production personnel for novel solutions to problems. ----------

3. Do you have formalized systematic search for evaluation of opportunities or acquisitions, new investments, etc in manufacturing. ----------

4. Do you make use of Staff Specialists (In-house Experts) to investigate and write report on major decisions. ----------

5. Do you use advance techniques such as MRP, JIT and TQM. ----------

B. Instruments for Management Approach:

Scale: The figures within the square braces indicate the **level of use.**

5. Do the Choices among strategic alternatives tend very often to be made quickly and without precision, as time pressures are often substantial *[0];* or much thought and analysis enter into key management decisions *[4].* ----------

6. Is the Management time consumed by decisions aimed at its resolution *[0];* or it is consumed by decisions aimed at exploring opportunities in the environment *[4].*

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7. Does the management adopt Short-term orientation *[0];* or Medium term orientation *[2];* or long term (over 5 years) orientation *[4].* ----------

8. Is the planning for the Long Term Investments, Technology, etc., done by the management very rarely or haphazardly *[0];* or it is done very frequently and intensively *[4].* ----------

C. Instruments for Information Gathering:

***Scale**: 0 = Not ever used; 4 = Used extremely frequently,* **with intermediate numbers representing appropriate level of use.**

9. Routine gathering of opinions from workers regarding processes tools and other suggestions. ----------

10. Explicit tracking of policies and tactics of Competitors. ----------

D. Instruments for Strategic Decision making:.

***Scale:** The figures within the square braces indicate the* **level of use.**

11. Do you employ consensus oriented team decision making for strategic decision *[0];* or decisions are made individually without much interaction *[4].* ----------

E. Instrument for Bargaining & Discussion:

***Scale:** 0 = Not very important; 2 = Moderately important; 4 = Extremely important.*

12. How important is bargaining and discussion for the Middle and Top management in the resolution of problems, conflicts or decisions? ----------

F. Instruments for Pro-activeness :

***Scale:** The figures within the square braces indicate the* **level of use.**

13. Do you have a strong tendency to follow competitors in introducing novel and innovative products *[0];* or do you always try to be ahead of competitors in product novelty or speed of innovation and usually succeed *[4].* ----------

14. Do you favour tried and true methods as compared to other competitors in the market *[0];* or are you growth, innovation and development oriented *[4].*

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15. Do you try to Co-operate and Co-exist with competitors *[0];* or do you pursue a tough " undo the competitors" philosophy *[4].* ----------

G. Instruments for Risks' Evaluation:

Scale: The figures within the square braces indicate the **level of use.**

16. Do you have a strong proclivity towards low risk projects (with normal and certain rates of return) *[0]* ; or does your firm have a strong Proclivity for high risk projects(with chances of high returns) *[4]*. ----------

17. Do you feel that it is best to explore the environment gradually via timid, incremental behavior *[0];* or it is best to explore the environment in a bold manner, wide ranging acts are viewed as useful and a common practice *[4]* ----------